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The Indications for and the Results of Artificial Pneumothorax Treatment in Pulmonary Tuberculosis*†

By J. Burns Amberson, Jr.

PULMONARY tuberculosis, recognized and treated properly in its very early stages, especially before softening and excavation have occurred, is a very healable disease. The problem of treatment would be relatively simple if it could be instituted always in this early most favorable stage. But the fact is that at least seventy-five per cent of tuberculous patients are in the moderately advanced or far advanced stage of the disease before they are correctly diagnosed and persuaded that treatment is necessary. Actually, therefore, one of our chief responsibilities is the care of advanced cases.

Once the minimal or early stage of pulmonary tuberculosis has passed and the disease has progressed to the point of necrosis and cavity formation, treatment becomes much more difficult and complicated. Many of these patients do remarkably well on sanatorium rest treatment; striking healing by resolution and fibrosis is sometimes observed; cavities not exceeding 2 to 3 cm. in diameter become obliterated in approximately fifteen to twenty per cent of the cases, and larger ones occasionally close if other conditions are favorable. But, even so, a considerable percentage of this more advanced group do not respond and are prone to relapse; and during their tenure of life, which may be years, many of them are chronic invalids. For these we look for some artificial aid.

It would be unfortunate, indeed, if, in their enthusiasm for the efficacy of newer aids to recovery, physicians forgot the fundamental value of rest treatment. Pneumothorax and surgery are accomplishing remarkable things, when the usual measures do not suffice, but let it be remembered that Nature, when given free sway with the patient at intelligently regulated rest, has even more remarkable things to her credit. If healing can be completed by Nature alone, as it often is, the finished product is usually the best. Pneumothorax and surgery may at times direct Nature's effort to more effective ends, but only as the dam and the sluice direct the stream to the mill wheel.

An understanding of certain principles concerned in the healing of pul-

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monary tuberculosis, as well as in its unfavorable evolution, is fundamental to a consideration of prognosis and treatment. The following are important in considering the use of artificial pneumothorax:

Once established in the lung, chronic tuberculosis of adults spreads by two chief ways. The first is direct extension to adjacent parts of the lung. The second is by contamination of distant or nearby tissues through tubercle-bacillus-laden pus. By this latter way, the bacillus is often carried through the bronchi to other parts of the same lung or to the opposite lung, and new (bronchogenic) foci of disease are set up. Similar surface contaminations of the mucous membranes of the larynx and intestine are chiefly responsible for the two most frequent complications of pulmonary tuberculosis, namely, tuberculous laryngitis and intestinal tuberculosis. There are other modes of spread, but these two confront us most often.

The discharge of infectious pus (a positive sputum) in ninety-five per cent or more of these cases is from a pulmonary cavity. The potential menace of the cavity is apparent for this as well as other reasons, such as the possibility of hemorrhage. Actual follow-up records at the Loomis Sanatorium show that tuberculous patients who never had a cavity or a positive sputum live longest and are least disabled of any; patients with cavities which closed under treatment and whose positive sputum became negative have the next best chance; those whose cavities remain open in spite of treatment and whose sputum continues positive have the poorest prospect of living long and, while living, the poorest prospect of being able to lead a normal working life.

The chief aim of treatment is to bar any further spread of the disease, which means to promote the maximum of healing by resolution and fibrosis and to bring about closure of discharging cavities, and then to maintain this state until the healing is most likely to remain durable and lasting. Loss of constitutional symptoms, such as fever, gain in body weight and other outward signs of improvement are to be sought, but these signs alone may be very deceptive as indicators of the ultimate safety and chance of lasting recovery of the patient. We must be sure, in addition, that we have secured satisfactory intrinsic healing of the disease if we are to avert later spreads, complications and chronic disability.

It is in the group of patients who do not achieve, or cannot be expected to achieve, the maximum healing and symptomatic recovery under approved rest treatment within a reasonable period of time that we consider the possibilities of artificial collapse therapy, of which the most extensively used form is artificial pneumothorax. In surveying this group, with pneumothorax in mind, we eliminate at once as unsuitable for such treatment all cases of advanced excavating disease widely affecting both lungs. Likewise we exclude provisionally those patients in whom tuberculous complications or nontuberculous disease appear to be of fatal omen and those who are obviously in the terminal stages of pulmonary tuberculosis. In unilateral

cases of the last type, pneumothorax is often attempted but usually with poor results; it is justifiable if clearly understood to be a desperate last resort measure.

The cases most suitable for pneumothorax may be listed as follows:

1. Extensive tuberculosis in one lung with widespread caseation and large single or multiple cavities. Usually the sputum is considerable and constitutional symptoms are very evident. These cases seldom heal sufficiently on simple rest treatment and pneumothorax should be induced after a short period of observation.

2. Acute unilateral pneumonic phthisis requires prompt action. In such cases if the toxemia is profound, the tuberculous process may caseate and break down in a few weeks, at which time pneumothorax may be ineffective, whereas in the first week or two it may save the day. If symptoms are mild, it is justifiable to wait and watch carefully with frequent X-ray films to determine the trend of the disease.

3. More chronic unilateral cases in which the patient's general resistance is good and in which there is a tendency to fibrosis, but in which cavities 5 cm. or more in diameter are already present. Usually a period of observation of a few weeks or months shows that these cavities will not close. Pneumothorax is given, not so much to control immediate symptoms, but more to avert a spread of the disease and to restore the patient to working ability.

4. Hemorrhage cases often need immediate pneumothorax. Almost all pulmonary hemorrhages in tuberculosis come from cavities. If the lung can be collapsed, the hemorrhage is stopped and the cavity is closed. Bleeding may be controlled even though the cavity remains partially open. In any bleeding case, intractable by other means, pneumothorax should be considered and usually is given at once. If it is a unilateral cavity case, one should not wait too long, even though the bleeding is not severe, because a posthemorrhagic spread of the disease is most to be feared.

5. In addition there are many cases in which indications are provisional and not so definite. In fact, most patients are best tried for a time on ordinary rest treatment to test their response and their powers of resistance. Then, if the disease proves progressive in one lung, as shown by careful clinical, laboratory and X-ray observation, pneumothorax is given. In some cases a few weeks decides this; in others, the issue may be in the balance for months. In recent years we have gathered courage to proceed earlier with pneumothorax in these patients with a doubtful prognosis, because, otherwise, we often do no more than prolong their lives for years of chronic invalidism.

6. The most difficult for decision are those cases in which the better lung is also diseased or in which other complications exist. Healed localized tuberculous deposits in the better lung should not weigh heavily against pneumothorax. Small fresh infiltrations in this lung often heal after pneumothorax is given on the worse side, but the risk is greater. Here, as in many

other comparable situations, no written rule is an adequate guide. Rules are compromised, and the clinical judgment of the physician experienced in this work as well as the attitude of the patient determines the line of action. In a few cases of bilateral disease, pneumothorax may even be given simultaneously on both sides.

The actual technique of giving pneumothorax and of managing these cases is a matter of accessible record. One important principle should be emphasized, which is that rest treatment is absolutely necessary in every case during the early months of pneumothorax. Later, it is often possible for the patient to resume work, meanwhile continuing his treatment. The technique of inducing pneumothorax is simple, and the needed skill is in knowing how to handle the various difficulties that are frequently encountered. They include pleural adhesions wholly or partially preventing the proper collapse of the lung, effusions usually of a serous character, empyema in a very few cases, air embolism rarely, and other minor complications. The judgment of the surgeon often is needed when pneumothorax fails.

The action of pneumothorax is dependent on a number of factors which have been substantiated clinically, pathologically and experimentally. They are chiefly immobilization of the lung in a more or less collapsed and functionless state; closure of cavities with later permanent obliteration of their lumina and stoppage of the infectious discharge (sputum); alteration of the circulation of the blood in the treated lung, and lymph stasis in this lung.

The experience with pneumothorax treatment at the Loomis Sanatorium, as recorded by Peters,[1] yields very convincing evidence of the efficacy of this measure. He compared the ultimate fates of those patients in whom pneumothorax was indicated but could not be given, and of those in whom pneumothorax was given satisfactorily. As compared with the former group, three times as many of the latter were alive after two to fourteen years, and, of those living, three times as many were leading normal, useful lives. Recently Riggins and I have studied the Loomis Sanatorium cases in which pneumothorax treatment has been completed with subsequent re-expansion of the lung. We have 165 of these cases, followed for an average period of five years after re-expansion. In 89 healing was good and the cavities were permanently closed; 78 (87.6 per cent) of these are living, and 78.2 per cent of the living are able to work or lead normal lives. In 76 healing was incomplete, and in none of these were the excavations completely closed on re-expansion; only 35 (41.6 per cent) of these are living, and, of those living, only 48.6 per cent are able to live normally, 4 of these having had later surgical treatment. Comparisons such as these speak for themselves and bear out our general belief that pneumothorax when it collapses the lung ade-

[1] Peters, A.: Artificial Pneumothorax at the Loomis Sanatorium over Fourteen Years. Amer. Rev. Tuberc., 1928, xvii, 348.

quately and is continued long enough, restores a majority of the patients selected who otherwise would be destined for an early death or, at best, permanent disability.

The problem of the necessary duration of artificial pneumothorax has been a vexing one, on which our study of re-expanded cases has thrown some light. We have found that the total duration of treatment is not so important as the duration of treatment after the cavities have been closed and the sputum has become negative for tubercle bacilli. Depending on a number of variables such as the original state of the lesion and size of the excavation, our patients did very well after re-expansion, if the lung was satisfactorily collapsed and the cavities kept closed for from eighteen months to two years. Often it takes months to close cavities, so that the average total length of treatment in our most successful cases was from two to three years. With close observation and care, it is not necessary to continue pneumothorax indefinitely, once a satisfactory collapse has been obtained.

Phrenicectomy and Intercostal Neurectomy for Pulmonary Tuberculosis*†

By John Alexander, M.A., M.D., F.A.C.S.

SATISFACTORY results from the use of surgery in certain of those cases of pulmonary tuberculosis which have failed to do well under sanatorium régime have been sufficiently numerous to create a demand for extension of the classical indications. This demand is being met. A few new procedures are being introduced, the effects of the old ones are now better understood, operative technique is being constantly improved and combinations of various procedures are being applied to a steadily widening variety of cases.

Unilateral diaphragmatic paralysis is being used more frequently than ever for both restricted and extensive lesions in either the upper or lower portion of the lung. In certain cases it is of surprising symptomatic value for pain that is caused by the tug of a moving diaphragm upon diaphragmatic adhesions and for excessive coughing or vomiting or dyspnea that is due to the same cause.

An increasing number of clinicians now prefer diaphragmatic paralysis to pneumothorax for unilateral lesions that do not include cavities of such large size that phrenicectomy could not be expected to close them. Reasons for this preference are that complications from expertly performed operations on the phrenic nerve are fewer than those which occur with artificial pneumothorax and that a single minor operation under local anesthesia takes the place of repeated refills of the pneumothorax with air for one, two, three or more years. If pneumothorax should later prove necessary the presence of diaphragmatic paralysis is usually useful rather than harmful.

Complete paralysis of half of the diaphragm can be made temporary, lasting about five months, if the main phrenic nerve as well as all accessory nerves are merely crushed instead of resected.

Since diaphragmatic paralysis can thus be made revocable its indications are obviously widened. When a patient who has failed to benefit from sanatorium régime has tuberculosis of both lungs and when it seems that more active measures offer even a small chance of improvement or cure, a logical procedure that J. Burns Am-

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berson[5] has proposed and that John Barnwell and I have used, is first to attempt to induce pneumothorax on the worse side before performing phrenicectomy on either side. If successful, another pneumothorax, a partial one, may be attempted on the other side or a temporary interruption of the phrenic nerve performed. If, however, satisfactory pneumothorax should fail to be induced on the first or worse side, a permanent phrenicectomy should be used there and later, perhaps, a partial pneumothorax attempted on the other side. Total paralysis of both sides of the diaphragm has not yet been shown to be effective or constantly safe. The principle of proceeding as described in this paragraph is to reserve the phrenic nerve operation for that side which is unable, on account of adhesions, to accept a pneumothorax.

Temporary phrenic interruption is also suitable for those cases of bilateral tuberculous disease in which diaphragmatic paralysis on the unoperated side might be indicated after diaphragmatic movement returned on the operated side, provided, of course, that the lung on this side had improved satisfactorily enough so that continuation of the diaphragmatic paralysis by reoperation was not required.

Temporary phrenic interruption is of very great usefulness in the acute and chronic stages of non-tuberculous abscess, in hemoptysis of tuberculous or non-tuberculous origin as well as for other tuberculous lesions in which permanent phrenicectomy is not desirable.

Return of function in a temporarily paralyzed diaphragm begins with short descending movements during quiet inspiration but the paradoxic movements persist on inspiratory sniffing, and the high position of the diaphragm still exists at this stage.

My experience with diaphragmatic paralysis has not led me to the conclusion that it is responsible, except perhaps rarely, for activation of tuberculous lesions in the contralateral lung. Tuberculous disease certainly does often progress in the contralateral lung after phrenicectomy, but I believe that it does so at least as frequently in patients with similar lesions in which no operation whatever has been performed. For this reason temporary phrenic nerve interruption in contradistinction to permanent interruption (phrenicectomy) is not often used except for the indications discussed in the preceding paragraphs.

The two methods of performing phrenicectomy to obtain complete permanent hemidiaphragmatic paralysis are (1) evulsion or exaeresis of the main phrenic nerve (Fig. 4, C) and (2) resection of two or three centimeter lengths of the main phrenic nerve and of any accessory phrenic nerves (Fig. 4, B). I prefer the second method as it conforms more closely to accepted surgical principles than the first in which the phrenic nerve is torn from the mediastinum where adherent tuberculous lesions or the pleura may be opened. Further, if during attempt to evulse the main nerve mediastinal adhesions cause it to break short of its junction point with an important accessory root, as it

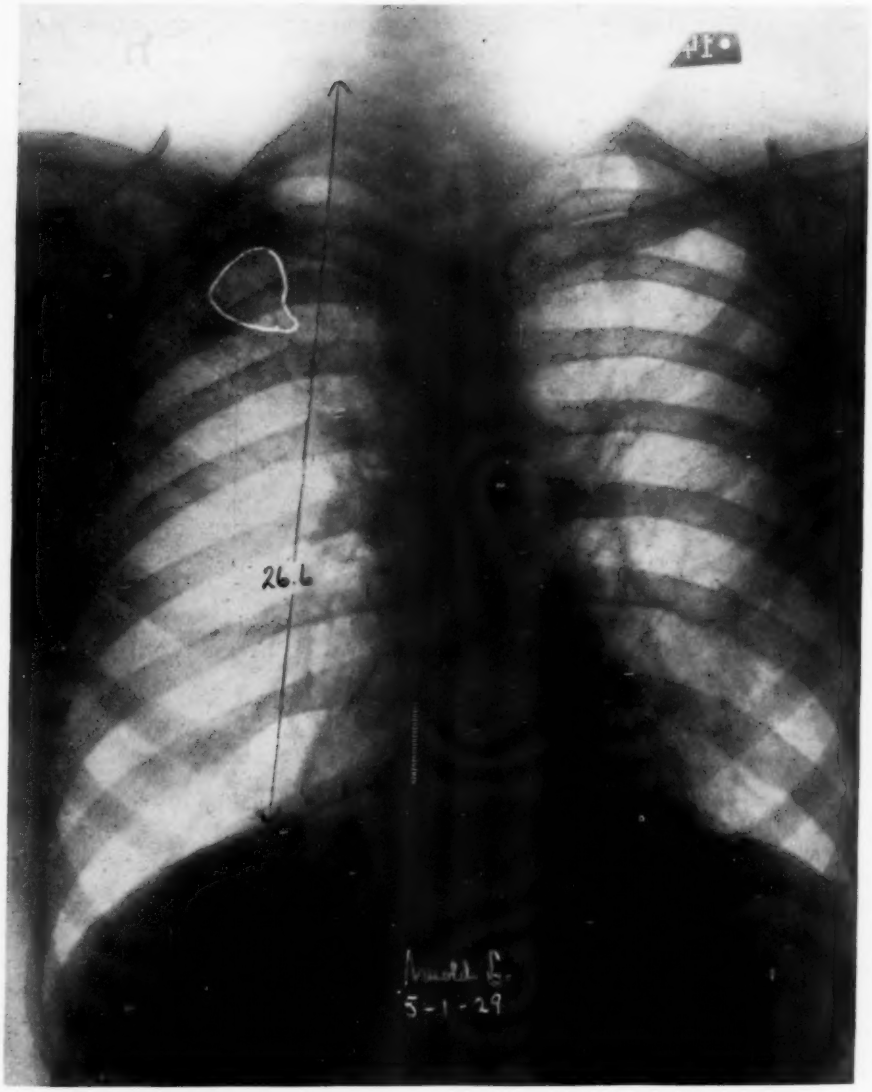


FIG. 1. Tuberculous cavity outlined with pencil, of at least 12 months duration. Sputum averaged 70 c.c. daily. See Fig. 2. Patient referred by Dr. Salvatore Locojano, Marquette, Michigan.

FIG. 2. Same patient as in Fig. 1. Complete closure of cavity and disappearance of sputum ten weeks after phrenicectomy, which resulted in only moderate rise of right diaphragm. In Figs. 1 and 2 the vertical position of diaphragm in chest is determined by measuring distance between first thoracic transverse process and dome of diaphragm. The clavicle is unsuitable as a measuring point because of its variable position in different films and the distance between the tops of the hemidiaphragms is not strictly accurate for comparison between different films because of the inconstant height of the unparalyzed hemidiaphragm during different roentgen exposures.

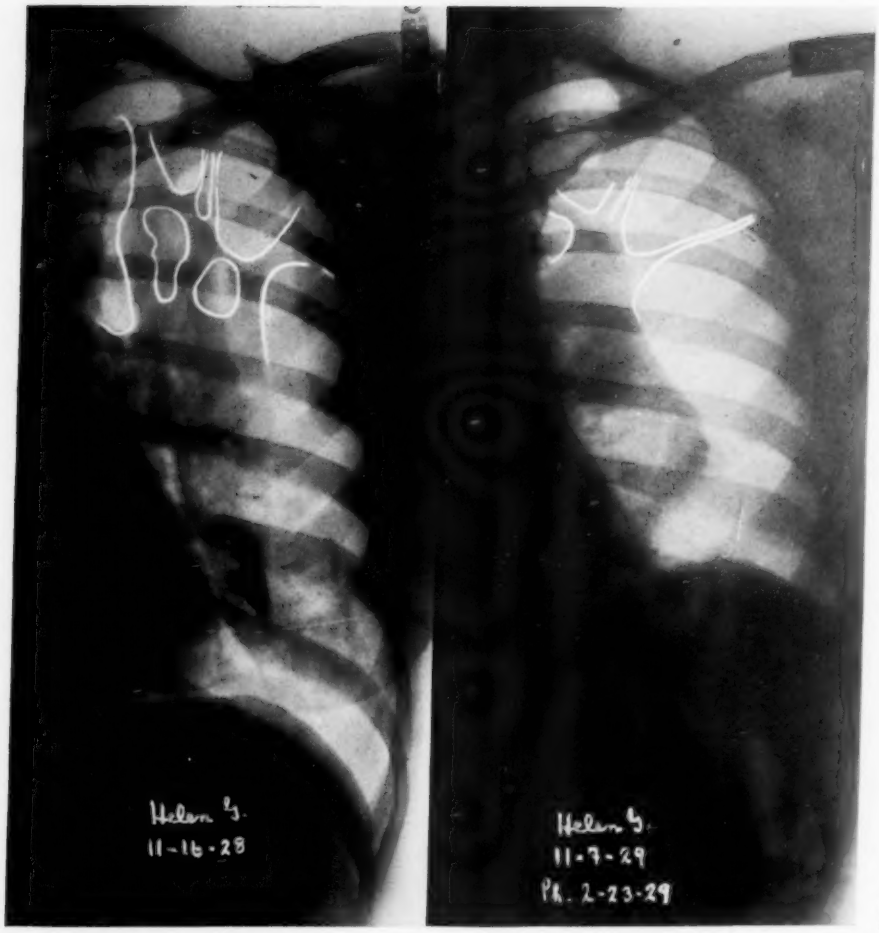


FIG. 3. Left film: Adhesions of upper lobe to costal wall and of lower lobe to diaphragm, which adhesions are keeping the lung stretched, thereby preventing artificial pneumothorax from closing cavities. Right film: Rise of diaphragm after phrenicectomy has shortened distance between adherent upper and lower portions of lung, thereby enabling pneumothorax to buckle in the cavities and close them. The first thoracic vertebral transverse processes of the two films have been placed on exactly the same horizontal plane so that rise of diaphragm may be seen. Though left film was taken two weeks after phrenicectomy, the diaphragm had then risen little; six and a half months later it had risen much, owing to its progressive atrophy and stretching. Patient referred by Dr. John B. Barnwell, University of Michigan Hospital.

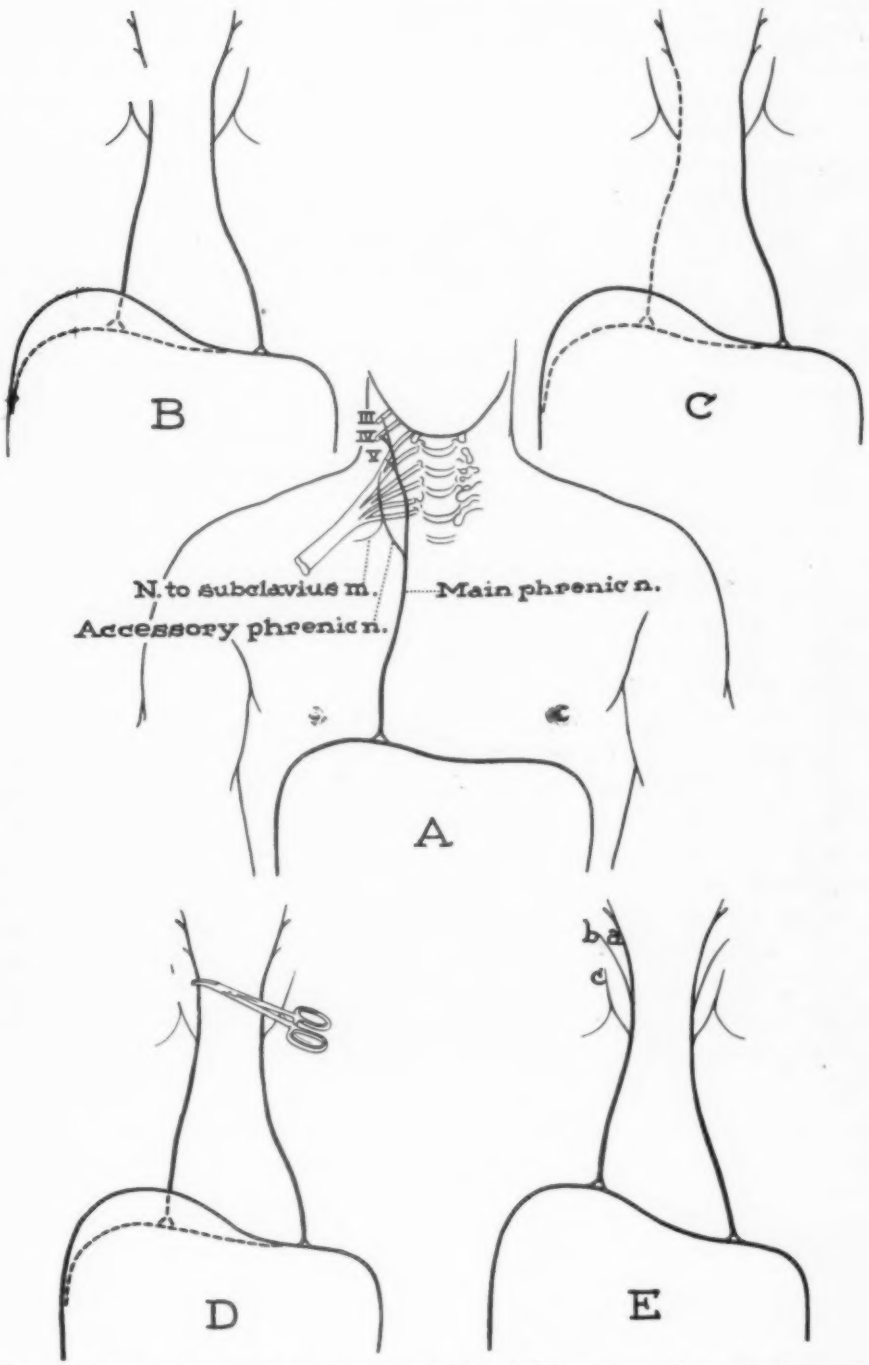


FIG. 4. Schematic diagrams illustrating the principles of different types of operative interruption of phrenic nerve.

A. Main right phrenic nerve arising from third, fourth and fifth cervical nerve roots; accessory phrenic nerve arising by common stem with nerve to subclavius muscle from fifth cervical root. Variations of origin of the one or several accessory phrenic nerves are not pictured.

B. Total paralysis of right diaphragm by resection of 2 or 3 c.m. of main and of accessory phrenic nerves (Goetze technique).

C. Total paralysis of right diaphragm by evulsion (exaeresis) of main phrenic nerve (indicated

rather frequently does, diaphragmatic paralysis may not be complete. See Fig. 4, E, for an additional reason in favor of multiple cervical resection of all phrenic roots. This operation is not much more difficult to perform than evulsion. I have frequently found two or more accessory phrenic roots (one of which, however, may have been the nerve to the subclavius) as well as the main phrenic trunk through a two or two and a half centimeter incision. If no accessory phrenic root can be found I do perform phrenic evulsion if there be no specific contraindications, and personally I have never had any accident occur from evulsion. Anatomical studies show that accessory phrenic roots are present in from 20% to 80% of all persons; I have found one or more nerves in the typical position for accessary phrenic roots in 76.6% of 77 recent consecutive phrenic operations. There is an additional advantage for surgeons to learn to identify all accessory roots as all must be crushed if a temporary phrenic nerve interruption is to be made complete.

It is customary to estimate the amount of pulmonary relaxation following phrenic nerve paralysis by measuring the postoperative rise of the diaphragm in posterio-anterior roentgen films. I have recently observed that a far better conception of the great amount of the lung that the risen paralyzed diaphragm displaces may be obtained from a lateral roentgen film (Fig. 6). Incidentally, ascent of the paralyzed diaphragm is not always necessary for a satisfactory clinical result, especially in hemoptysis, although it is usually true that the higher the ascent, the better will be the effect of the operation.

Complete paralysis of a hemidiaphragm causes improvement in more than half of those cases of pulmonary tuberculosis for which it is properly used and, in a few, it seems to be responsible for arrest of the disease. Werner and O'Brien[16] have recently compared the effect of phrenicectomy and of non-surgical treatment upon two groups of one hundred patients each, which groups, however, are not strictly comparable. After phrenicectomy 55.2% of the sixty-seven thin-walled cavities became closed, 38.8% decreased in size, 1.5% remained stationary, and 4.4% became larger. One hundred per cent of twelve cases of moth-eaten cavities closed. After non-surgical treatment only 18.1% of sixty-six thin-walled cavities closed, 12.1% became smaller, and 69.7% became larger. The results of phrenicectomy were not superior in the case of thick-walled cavities, in that none

by interrupted line) which ruptures connection of accessory phrenic nerve with diaphragm (Felix technique).

D. Total but temporary paralysis of right diaphragm by crushing the main phrenic nerve for width of a hemostat's blades, and resection of a portion of the accessory phrenic nerve, whose regeneration is not important for return of diaphragmatic function. Should reoperation later be required to make diaphragmatic paralysis permanent, the accessory nerve would not need to be found.

E. Variation in origin of phrenic nerve observed in two patients. Nerve *c* was in typical position for the accessory phrenic nerve and nerve *b* was in typical position for the main phrenic nerve. Nerve *a* lay far medially, back of the carotid sheath; if *b* and *c* but none of *a* had been resected, diaphragmatic paralysis would have been incomplete. Had nerve *b* been evulsed in the belief that it was the only main nerve, it would probably have broken away from *a*, which was heavier than *b*, and left *a* intact and functioning. It is likely that this explains the incomplete paralysis that has occasionally been reported to follow evulsion of as many as 10 cm. of a nerve that was in the usual position of the main phrenic nerve.

was closed by the operation and 42.8% decreased in size, whereas non-surgical treatment was followed by closure in 5.8% and decrease in size in 50%.

In those clinics where phrenic nerve operations are used frequently, complete arrest of the progress of advanced lesions, although it occasionally occurs, is not expected from it and therefore in suitable cases artificial pneumothorax, multiple intercostal neurectomy, extrapleural pneumolysis, or extrapleural thoracoplasty is frequently added as a complementary operation as soon as the maximal beneficial effects of the phrenic operation have been obtained and before the tuberculous disease has spread so far that such procedures cannot be properly considered.

Among the operations just mentioned, only intercostal neurectomy will be considered in this paper as its share in this symposium. The procedure may be briefly described by quoting, through the courtesy of The Editor of the American Review of Tuberculosis, the summary and conclusions of a recent extensive article on the subject (Alexander[4]):

1. Unilateral multiple intercostal neurectomy preceded by phrenicectomy in dogs and rabbits greatly decreases the mobility of the hemithorax in quiet respiration and causes a moderate decrease in its size. Dyspnea does not result.

2. On the basis of constant experimental findings and of the expected beneficial effect on human pulmonary tuberculosis, I have used the operation on 6 patients.The clinical results have been startlingly good in three; negative in one in whom lesions in the contralateral lung, intestines and larynx, where they were beyond reach of the operation, continued to progress; death in one from cardiocirculatory decompensation to which the operation was a final contributing cause; and in the last patient operation three weeks ago has been too recent to permit consideration of the result, although so far the clinical course has been highly satisfactory.

3. Phrenicectomy should be performed one or more weeks in advance of intercostal neurectomy.

4. Multiple intercostal neurectomy may be painlessly performed in one stage under local anaesthesia. A longitudinal incision is made to the angles of the ribs and two or more centimeters of the second to eleventh intercostal nerves, inclusive, are resected at the costal angles distal to the posterior rami. Exceptionally, for limited lesions, fewer than ten nerves may be resected and, if temporary diaphragmatic and intercostal paralysis be clearly indicated, the nerves may be crushed rather than resected, or they may be injected with alcohol.

5. As no rib is divided and as, therefore, the thoracic wall retains its protective rigidity, the patient is better sheltered from the two chief dangers of thoracoplasty, which are cardiocirculatory failure and rapid spread of the tuberculous lesions. Although intercostal neurectomy impairs the function of expectoration, extension of infection from stasis of secretions within the lung has not occurred in

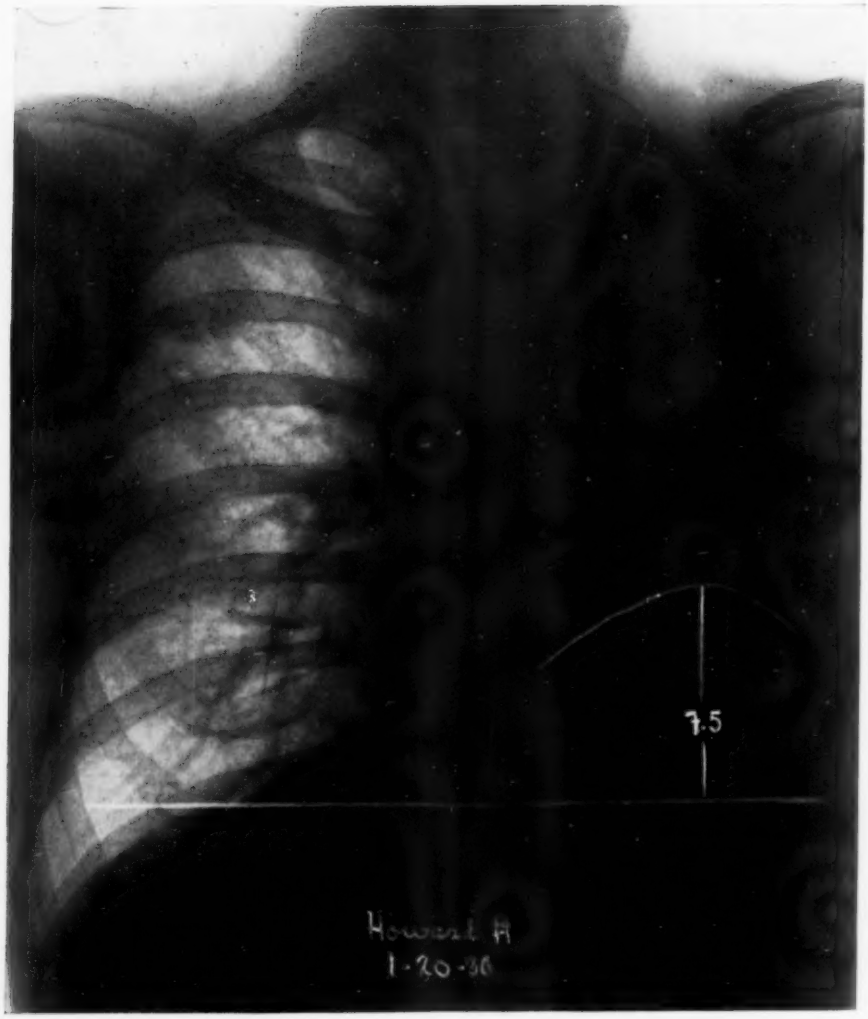


Fig. 5. Rise of left diaphragm after phrenicectomy. Dome of left diaphragm is outlined with pencil. Horizontal line crosses dome of right diaphragm. See Fig. 6. Patient referred by Dr. W. E. Fawcett, Michigan State Sanatorium.

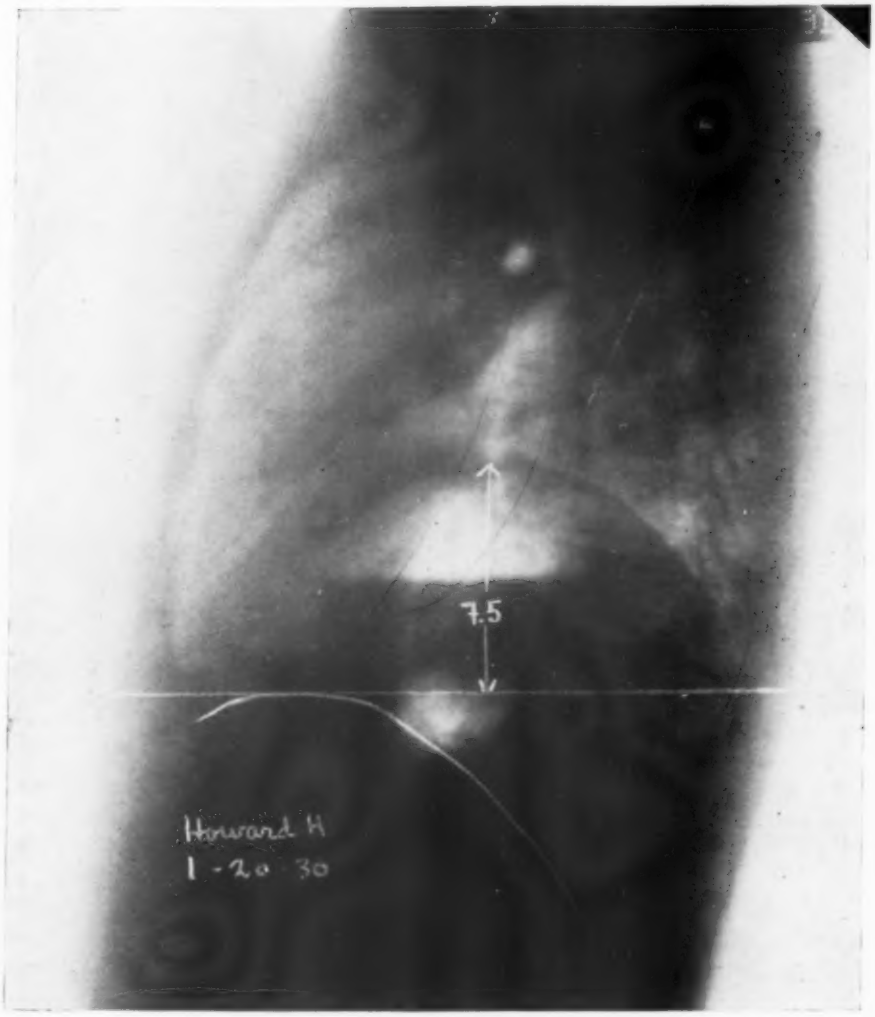


FIG. 6. Same patient as in Fig. 5. Rise of left diaphragm after phrenicectomy; lateral projection. Unparalyzed right diaphragm is outlined with ink; horizontal line crosses its dome. Risen, paralyzed left diaphragm is plainly visible. Only the 7.5 cm. rise of the left dome above the horizontal line is visible in the antero-posterior projection (Fig. 5) but not the rise and posterior displacement below the horizontal line. The lateral projection, therefore, gives a truer conception of the amount of lung displaced by a paralyzed hemidiaphragm than does the antero-posterior projection.

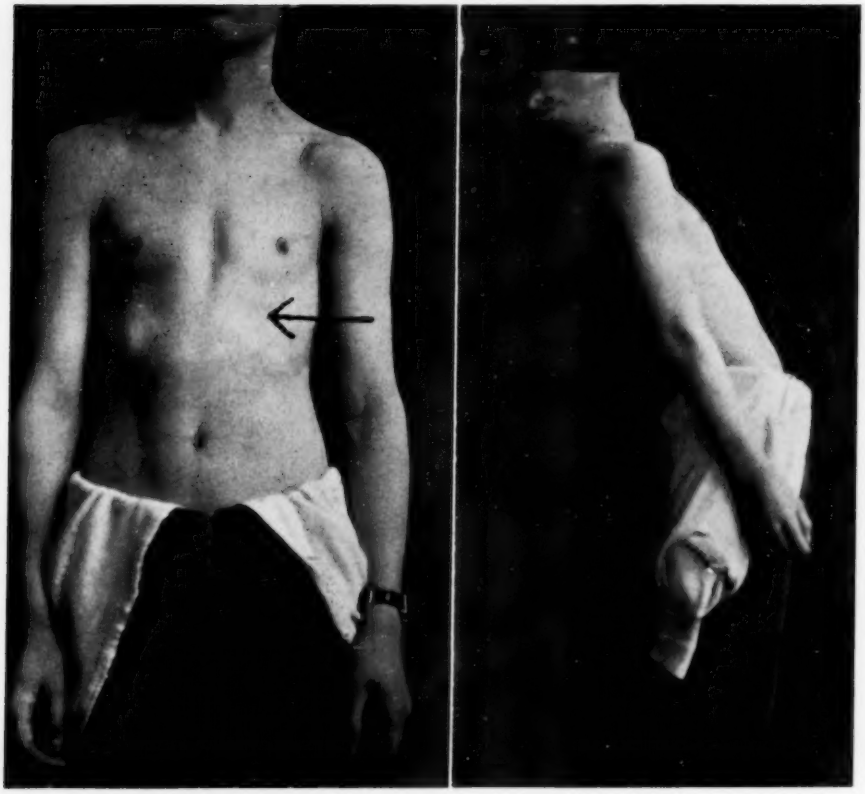
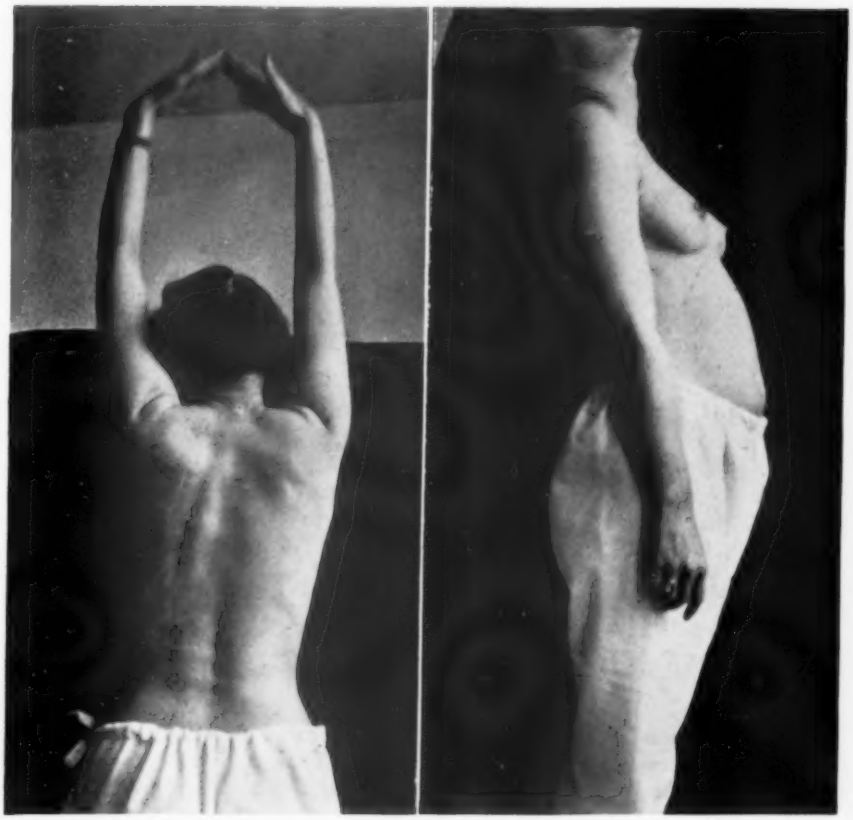


FIG. 7. Lateral views of patients leaning backward show absence of protrusion of paralyzed abdominal muscles after intercostal neurectomy of nerves 2-11 inclusive in the man and 2-10 in the woman. Absence of protrusion is explained by attachment of the small area of paralyzed upper abdominal muscles to rigid costal margin and by paralyzed muscles being kept taut by contiguous unparalyzed muscles. Posterior view illustrates un-

any of my cases. This theoretical danger has not, however, been tested by sufficient clinical trial.

6. Since the operative mortality from intercostal neurectomy may be expected to be far less than from thoracoplasty, the former may be used in certain of that rather large group of patients who are not suitable subjects for thoracoplasty and in whom pneumothorax has proved inadequate. Such patients include both those who are too ill for thoracoplasty and those who are not ill enough, in view of the risk, and yet for whom further aid is necessary in order to bring about arrest of the disease. Among patients too ill for thoracoplasty should be included those who are too old or too frail, or whose cardiocirculatory reserve is inadequate, or in whom the chance of activation of lesions in the better lung seems too great.

7. Obviously, noteworthy preoperative dyspnea or impairment of cardiocirculatory function should contraindi-



impaired function of shoulder girdle on operated left side. Anterior view shows depression of costal thoracic wall between nipple and costal margin on operated left side owing to intrathoracic fibrosis and to persistent expiratory position of left thorax. Man referred by Dr. W. B. Huntley, Michigan State Sanatorium and woman by Dr. Fred Holmes, Phoenix, Arizona.

cate intercostal neurectomy as it would thoracoplasty. However, certain lesser degrees of impairment of cardiocirculatory or respiratory reserve that would make thoracoplasty unsafe may prove a reasonable operative risk for intercostal neurectomy.

8. Emphatically it is not my intention to offer multiple intercostal neurectomy as a general substitute for thoracoplasty, for this it never can be. The majority of cases of pulmonary tuberculosis demand a considerable reduction in the thoracic diameters in order to close large cavities or, in certain cases, to compensate for the contraction that occurs with extensive pulmonary or pleural fibrosis. These demands thoracoplasty meets best, if artificial pneumothorax has failed because of pleural adhesions. In such cases intercostal neurectomy is indicated as a preliminary operation preparatory to thoracoplasty only when

the patient is in unfit condition for thoracoplasty.

9. But I do recommend this operation, with the reservation that my clinical experience with it is based upon only 6 cases, as an apparently effective substitute for thoracoplasty in those cases in which there is no very large cavity demanding mechanical closure, but in which considerable reduction of respiratory mobility, together with some retraction of the thoracic wall, is desired.

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Thoracoplasty in the Treatment of Pulmonary Tuberculosis*

By Philip King Brown, M.D., *San Francisco*

A CONSIDERATION of the place of thoracoplasty in the treatment of pulmonary tuberculosis presents two main questions. What will this procedure do that cannot be accomplished otherwise, and at what point in the treatment of the disease is this radical procedure indicated. From the background of nine years' observation on about 50 thoracoplasty patients most of them operated upon by Dr. Leo Eloesser of San Francisco, preceded by a thirteen-year period of following the disease in special clinics, tuberculosis classes run after the plan of Dr. Joseph Pratt of Boston, in several sanatoria and the tuberculosis wards of a general hospital, it seems reasonable to draw deductions from the results with similar types of patients treated before thoracoplasty and since its use, and to contrast as a control group in the latter class what has happened to the patients for whose relief thoracoplasty was recommended and who refused it.

It must be borne in mind that in the early years of doing this operation in this country, it has been tried as a last resort on many patients far too advanced to warrant one in drawing deductions as to its value further than that these far advanced cases who survived the operation illustrated how little is the shock in the hands of able surgeons and how much relief of toxic symptoms often follows the closing of cavities. The time should be wholly past when the operation is justified on these grounds alone, for when patients have progressed unfavorably to a critical point, it is unfair to ask a surgeon to do an operation that can only relieve symptoms temporarily. It seems too much like removing the cancerous breast when metastases are already noted. It is frequently the case in any new procedure, that only the desperate and hopeless cases are considered for operation. It is of value to know how advanced a case can stand an operative procedure, but it is the part of accumulated wisdom to determine at what point the operation offers relief with the least risk to the patient and with the best chance of permanent arrest of a diseased process that had not responded to any lesser measures. In other words, it is the part of the tuberculosis specialist so to measure up a patient's chances from accurate de-

*Presented by invitation at the Fourteenth Annual Clinical Session of the American College of Physicians, Minneapolis, Minnesota, as part of a symposium on "The Surgery of Pulmonary Tuberculosis."

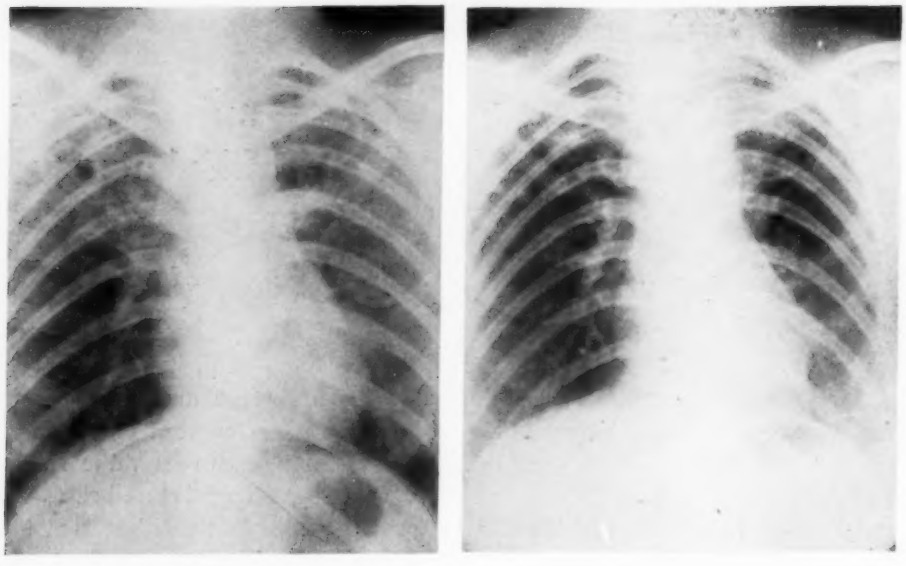

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FIG. 1—*Cavities bilateral, closing on bed rest alone.*
1—Bilateral apical cavities size of silver dollar.
2—Both cavities closed in 11 months rest in bed.

termination of changes resulting from treatment, that he may say with reasonable degree of certainty, the time has come when the patient faces defeat, perhaps several years postponed, without the help of conditions which thoracoplasty alone may bring about.

To illustrate this point that there is a right moment for thoracoplasty is the object of this presentation. To show it the more clearly the cases presented are nearly all selected from a sanatorium run for young working women where the visiting staff of three physicians, the director and a surgical consultant have seen and studied every case. The principles of care have been based on supplying to the full the recognized fundamental essentials of sanatorium care, with the introduction of only one variable at a time. A staff evaluation of progress in all doubtful cases is the rule and each successive step, whether it be postural rest, the use of tuberculin, the elimination of some disturbing physical handicap, the use of pneumothorax or some surgical procedure, has been always the result of conference. Thus 5 people have agreed upon the next factor to be introduced, each time that the patient had reached a standstill. It must be made clear that thoracoplasty is possible only when one side is well enough to carry the full load without danger of breaking down. It has been our repeated experience, as is true also of pneumothorax, that successful thoracoplasty is followed by continued improvement in the arrested process of the other side. The same rule that applies to pneumothorax applies equally to thoracoplasty. The increased burden on the relatively good

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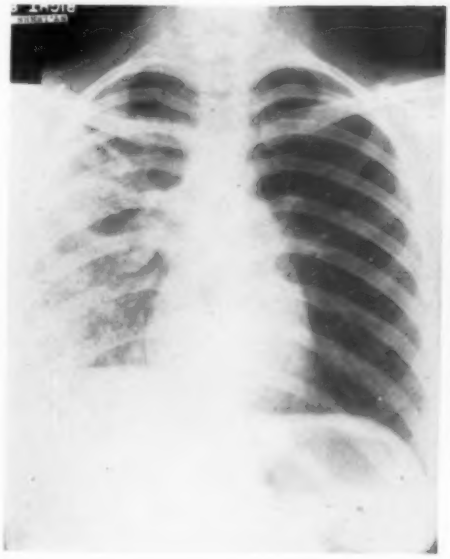

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FIG. 2—*Large unilateral cavitations closing on postural rest.*
1—Two very large cavities right upper lobe, right diaphragm somewhat raised.
2—After 6 months in bed upper cavity enlarged.
3—Afte 1 year more postural rest both cavities disappearing, trachea, heart and mediastinum shifted to right, diaphragm higher, rib spaces on right not strikingly narrowed.
4—After 4 months more of postural rest, same conditions of shifting of mediastinum, rib interspace much narrowed, right lung field nearly clear, cavities closed.

1 2 3

FIG. 3—*Phrenicectomy.*
1—Bilateral process multiple honeycombed cavitations on right, fairly extensive but not intensive process on the left.
2—After several months in bed coalescence of cavities at right base, small cavity outside left hilus. Pneuumothorax effective only at right top.
3—Both cavities closed after phrenicectomy.

side must not be too great or applied when the lung is not in an arrested condition. A preliminary phrenic nerve evulsion puts only a slightly additional burden on the arrested lung and serves to test its ability to carry an increased load.

Patients who have been for years struggling to close one-sided cavities without success are obviously good cases for thoracoplasty. They have good resistance but are dangerous to themselves and others and must continue indefinitely to lead sheltered lives unless we can close the cavities. Where we find the shoulder low on the affected side, the diaphragm high and the heart, trachea and mediastinum pulled toward the diseased side, and still a cavity persists, thoracoplasty merely continues to its ultimate limit what Nature has struggled often for years to accomplish without success.

Thirty-six patients (Group I) reached that point and have been operated upon, of whom six are dead of tuberculosis, one of spontaneous pneumothorax followed by empyema where the operation of thoracoplasty was done in the hopes of relieving a pyopneumothorax and where the patient probably produced the death by overzealous lavage of a fistulous tract, and one of malignant disease after apparent cure of her tuberculosis for 7 years. Nine (Group II) have refused operation, of whom *six* are dead, one arrested after five years of further sanatorium care and two are still alive after two years, in sanatoria. The average duration of sanatorium or supervised home care of the group who were operated upon was less than one year and in one case only four months. The longest duration of the arrest is the first patient operated upon who previous to thoracoplasty had had seven years of sanatorium care and who has earned her living for eight of the nine years since operation. Two we know have borne children with no disturbing results.

The economic aspect of these patients successfully relieved of activity by thoracoplasty is most gratifying. One has taught school, rides horseback

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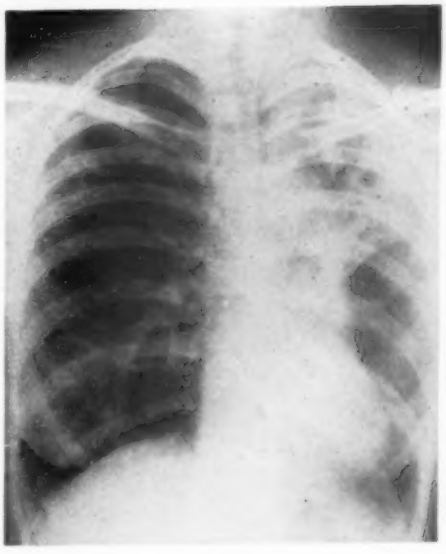

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FIG. 4—*Thoracoplasty refused—pneumothorax having failed.*
1—Left upper tuberculous pneumonia and diffuse involvement of left lower.
2—Incomplete collapse with pneumothorax owing to adhensions top and bottom.
3—Loss of upper part of the pneumothorax.
Thoracoplasty recommended and refused. Patient left the sanatorium. Lived semi-sheltered life for 3 years.
4—Plate of chest few weeks before death.

and is in every way a normal person. Another is night operator in a hospital where she has continued to gain for many months. Many of them resumed normal home relations as housewives for the first time in periods varying from 3 to 10 years. One is a Public Health nurse on full time work still after 6 years of steady work.

Not the least advantage of the time-saving aspect of thoracoplasty is the overcoming of an almost hopeless demoralization that long years of sanatorium life is too apt to induce. It seems fair to raise the question also as to whether it be not vastly preferable to undergo thoracoplasty rather than submit for 9 years, as did one of our patients, to refills of a pneumothorax. So satisfactory have been the results in well chosen chronic cavity cases that it should appeal to anyone as the method of choice if for sufficient reason it seemed desirable to keep a lung compressed permanently. I doubt if the general run of patients upon whom pneumothorax has been done have averaged as well as have these girls who have been compressed surgically.

There can be no question but that thoracoplasty should be resorted to at once, if it were justifiable to consider it at all, provided repeated attempts at pneumothorax should be unsuccessful in bringing about satisfactory compression. Our experience as shown by Group III argues against too long delay. This experience has been called attention to very pointedly by Brauer, who learned to do his own surgery, and by the Matsons in our country, who have contributed most importantly to this subject of the necessity of taking advantage of every factor in a case in determining the opportune moment for any radical method of interference. Recognizing this, we have invited surgical consideration of many patients whose progress was not satisfactory, long before we were ready to ask for operative relief. It seemed unfair to invite a surgeon to operate upon a patient unless he had become familiar with the progress of the patient up to the point where his aid seemed immediately necessary.

There were no operative deaths in this group. The deaths from progress of the tuberculosis were due in one case to the huge size of the cavity, in another to the fact that there were three cavities vertically placed and not enough resection was accomplished to close them, although several resections were done and even the clavicle was shortened. A further group should be referred to in order that the picture may be complete—patients known to be hopeless because of long continued care with improvement on one side and progress of the disease on the other. These patients had been accepted by the sanatorium because of our study of the possibilities of surgical relief with the distinct understanding presented to them or their families in writing and agreed to, that if sufficient improvement took place in the less advanced side to warrant an attempt to compress the relatively bad side, this should be tried by progressive means until accomplished. In this way there was no question of persuading the patients and they lent themselves unusually well to each ef-

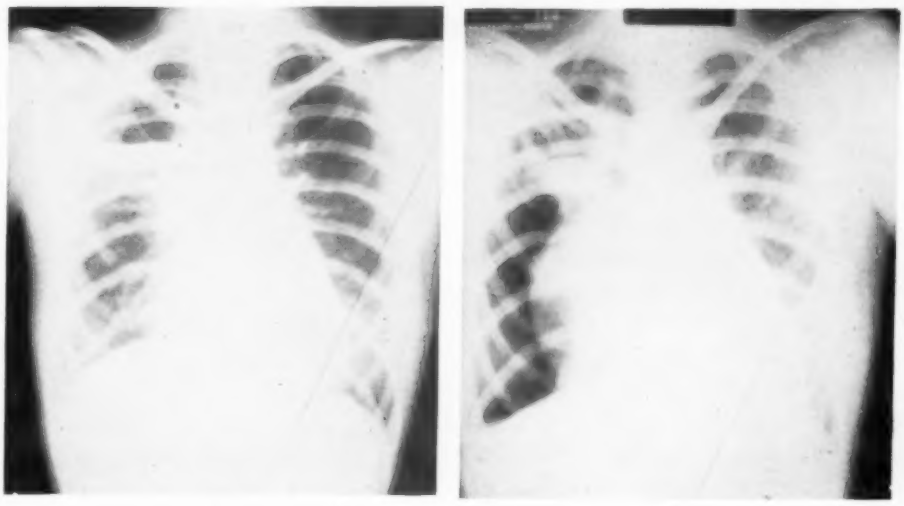

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FIG. 5—*Thoracoplasty refused.*
1—Large right apex cavity, infiltration moderate in rest of right side.
2—After unsuccessful efforts to compress by artificial pneumothorax for 4 months. Died within 1 year.

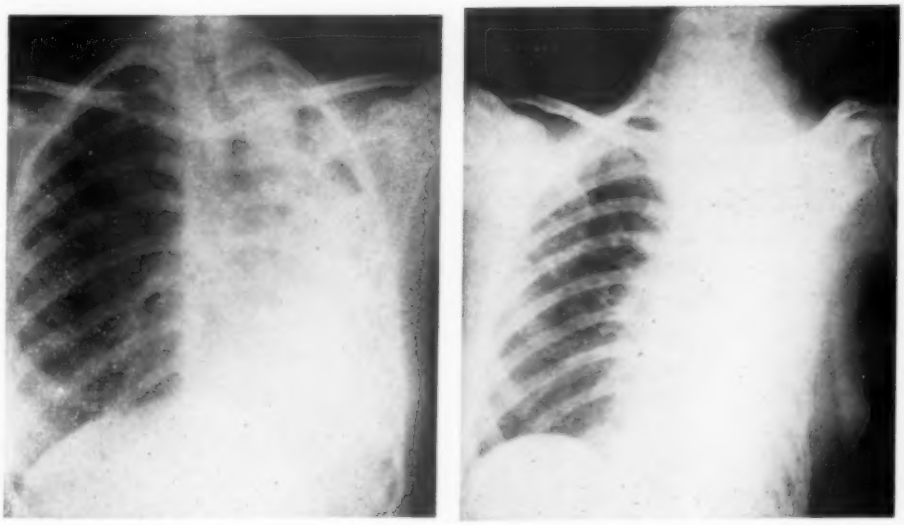

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FIG. 6—*Thoracoplasty.*
1—Extensive left-sided cavitation and small spontaneous pneumothorax. Shift of mediastinum to left. No result from phenmothorax.
2—After operation.

fort of ours to help. Two developed colds contracted in a closed machine from the husband of one while enroute to the hospital for preliminary phrenicectomy. Both had rapid lighting up of their trouble and both died. Seven had relapses at the sanatorium and died, five of them before all the staff and the surgeon could agree that the time for the final step had come, and two because of their own procrastination. It seemed to me fair to include all of these in the contrast group. Still another group should be mentioned in contrast to this last most discouraging one, and that is the six patients admitted for surgical consideration who improved on both sides, or if unilateral at the start, they improved on the affected side so steadily and so rapidly that they went on to arrest without the help of even pneumothorax. Several had had this procedure tried without success before coming to us. Plates are made every two months of all patients considered for surgery, the same technique being used so that cavity measurements are accurate. Fever records, measured sputum, weight gain, heart action and all the possible variables that enter into the estimation of progress are considered every two months by the staff in each of these cases. One of these patients upon whom pneumothorax had been unsuccessful on account of adhesive pleurisy was summoned home to care for a father after the mother had died, and in the emergency, the right mid lobe cavity having remained stationary too long, a phrenicectomy was done which fortunately closed the cavity. Two years have gone by and the disease is apparently arrested.

The case is referred to because it is not always possible for the mediastinum to shift or the rib cage to be contracted by adhesive pleuritis, and cavities remain unchanged in size even after months of postural rest.

It is plain to the specialist in tuberculosis and to those general practitioners like the writer who have a deep interest in making tuberculosis a treatable disease and not a boarding house or custodial job as it is too often, that upon first examination of a patient with well established pulmonary tuberculosis, every collectable bit of dependable evidence must be assembled and this includes a carefully taken detailed history of every incident bearing in any way on the patient's condition—old temperature records—x-ray plates, weight records, pain, coughing period—all this helps to evaluate the patient's chances and enables the examiner to lay out, in his own mind, at least, a plan of action.

At this point it is interesting to note Bachmeister's statistics of the experience of Swiss Sanatoria with cavity cases. "Given a cavity the size of a cherry at the onset of sanatorium care and unless that cavity has steadily shown a tendency to close and does close or has been closed by artificial means, only 20 per cent of chances exist that the patient is alive in six years even with continuous sanatorium care." This emphasizes what our own experience has taught us in its small way, that the careful physician makes his preparation for a siege when he assumes the defense of a patient with well established pulmonary tuberculosis and at all times he must conduct

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FIG. 7—*Apicolysis.*
1—Extensive left-sided process with multiple small cavities. Slight process at apex.
2—Further breaking down on left side. Cavity formation behind first rib at right apex.
3—Improvement on both sides after partial left pneumothorax. Extensive adhesions.
4—Apicolysis. Top 6 ribs. Pneumothorax continued.
Well and working.

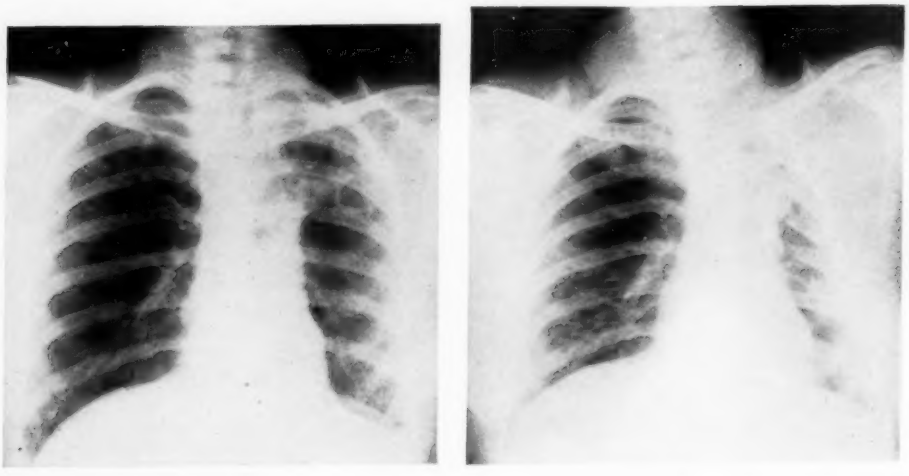

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FIG. 8—*Apicolysis.*
1—Two large cavities at left top under sternum. Under sanatorium regime 7 to 8 years. Pneumothorax impossible.
2—Apicolysis—top 6 ribs.
Well and working within 1 year.

1 2 3

FIG. 9—*Thoracoplasty.*
1—Extensive cavitation of the left top. Pleuritis. Retraction to left of mediastinum and heart. Diffuse but slight process in right upper.
2—Right upper completely arrested after 4 months.
3—Thoracoplasty with complete cure. Patient has borne children. Well for 6 years.

the case so that the patient's increasing or diminishing chances are evaluated properly so that the pursuit of one method of help may not be continued too long to the jeopardy of the next and the next moves in the game. In other words, we must remember Pryor's dictum, never truer than now, that "We must treat the consumptive in the right way at the right place at the right time until he is cured and not in the wrong way at the wrong place and at the wrong time until he is dead."

GROUP I

36 thoracoplasties in 9 years, because of the failure of rest and pneumothorax to close large cavities:

6 died of tuberculosis,
1 died of cancer after 9 years of health,
1 died of sepsis, 2 years following a thoracoplasty for pyo-pneumothorax.

—

8 died.

GROUP II

9 offered thoracoplasty after failure of other methods and operation refused. Of whom:

6 are dead,
1 clinically well,
2 in sanatoria after 2 and 3 years further care.

GROUP III

9 far advanced cavity cases admitted for pneumothorax or thoracoplasty or both and died in relapses after decided improvement. Death attributed primarily to delay in operation.

GROUP IV

6 far advanced cavity cases admitted for pneumothorax or thoracoplasty or both if found necessary and recovered without either procedure.

Several of these had bilateral cavities of size in excess of 3 cm. diameter.

Summary and Conclusions

1. While it is true that large cavities may close entirely as a result of postural rest, pneumothorax, phrenicectomy or intrapleural pneumolysis (Jacobeus), one should not postpone too long a trial of thoracoplasty in cases that come to a standstill *before* the closure of large cavities, or that have constantly recurring hemorrhages in spite of what compression can be effected by pneumothorax.

2. The deformity from complete unilateral thoracoplasty is neither an esthetic nor economic handicap. The objection offered to thoracoplasty because of its deformity is best answered by Dr. John Alexander who writes (National Tuberculosis Association, Vol. XXV, Page 96): "The so-called deformity following thoracoplasty should not be properly included in a basic discussion of the relative merits of the two operations (multiple intercostal neurectomy). Ordinarily the deformity following a properly executed thoracoplasty is so little that the term is a misnomer unless intended in its literal and not its usual sense."

3. It must not be recognized as a cure, but as a means to cure where physical conditions prevent the closure of cavities.

4. Thoracoplasty is an aid to Nature's method in closing cavities where its success is threatened by seemingly insurmountable difficulties, size of cavity, its being held open by extensive adhesions, the recurrence of large hemorrhages and the failure of lesser efforts to help.

General Considerations of the Rôle of Surgery in Pulmonary Tuberculosis*

By Dr. Gerald B. Webb, *Colorado Springs, Colorado*

TUBERCULOSIS in any part of the body is generally considered to be a medical disease. Surgical intervention then is a confession of failure on the part of the physician. At present tuberculosis of a single kidney is the only condition that physicians instantly submit to operation. Chisholm's complete cauterization operation for rectal fistula is doubtless a surgical success. So-called surgical tuberculosis is, strictly speaking, not surgical. Tuberculous joints are treated by rest, by splinting and by sun therapy. For the most part tuberculous lymph nodes, tuberculous testicles, and tuberculous intestines, are not operated; a tuberculous larynx is treated by a régime of silence and by heliotherapy; and tubercle of the retina or choroid is one type of disease which certainly is benefited by tuberculin therapy. The surgical procedures advocated in pulmonary tuberculosis are all methods of increasing rest of the lung, and rest is the only successful treatment yet devised for this disease. The symposium covering surgical procedures for obtaining increased rest of the tuberculous lung has been splendidly presented. There are two good reasons why the development of such surgical assistance has come to pass. Firstly, the diagnosis of pulmonary tuberculosis is lamentably late, and secondly, the régime of rest in sanatoria and elsewhere is rarely efficiently carried out. The early diagnosis of pulmonary tuberculosis would be more frequently made if all patients were submitted to x-ray study, and if all children entering and leaving High School were given the advantage of this comparatively inexpensive examination. The correct régime of rest is costly, and sanatoria cannot always afford the nursing care which is so necessary. Surgeons who take charge of tuberculous joints do not allow motion of these joints for a very protracted period, but physicians have never yet realized the prolonged and complete rest that is necessary for the recovery of their patients with pulmonary tuberculosis. The prosperous classes can obtain the thorough rest, the poorer cannot. Then temperaments must be considered, for as Solly wrote: "The wise have four times as good chance to recover as the foolish." In this regard Shakespeare's words are pertinent:

*Presented before the American College of Physicians February 14, 1930, Minneapolis, as Part of a Symposium on "The Surgery of Pulmonary Tuberculosis."

"And all our yesterdays have lighted fools
The way to dusty death."

And again:—

"How poor are they that have no patience!
What wound did ever heal but by degrees?"

Decision to submit a patient to surgery will depend in part on the ability of the patient to finance a longer period of rest, to a certain degree on the mentality of the patient and also to the degree of the disease. Under my care at present is a patient who, two years ago, was advised by his physician to go to Sauerbruck for thoracoplasty. The patient under rigid rest régime has done remarkably well and his sputum is free from tubercle bacilli. It is not understood by the profession that tuberculous pleurisy, especially with effusion, is a serious infection which needs several years' watchful after-care. Such patients, who are apt to develop serious pulmonary tuberculosis, supply a not inconsiderable number of subjects for surgical aid.

I cannot agree with a recent writer that "practically every demonstrable unilateral tuberculous lesion should have some form of (surgical) compression therapy and that almost none of them should be left to bed rest alone." However, compression therapy must be considered earlier in those patients who for one reason or another cannot carry out the proper prolonged rest régime. Three years ago before this association I advocated and described postural rest for unilateral lesions, and the application of shot bags for bilateral lesions. After sixteen years, practicing these principles, I still believe that this method of treatment should be first tried and faithfully carried out for at least six months to a year. Roentgen studies from time to time will indicate the progress that is made apart from the clinical benefits.

Within the last week a lady from Michigan dropped in to pay me a social call, who sixteen years ago had been directed to me for pneumothorax treatment but who completely recovered under postural rest.

Artificial pneumothorax is our second choice, but in only one-third of the patients in which this is attempted is the result apt to be satisfactory. It has dangers which have been mentioned. Septic pleurisies are reported by some authorities in 5% of the successfully treated, severe pleurisies in 30% and purulent pleurisies in 4% to 11%. The last may vanish under skilled treatment, or may lead to amyloid disease if thoracoplasty cannot be performed. The chief objection to pneumothorax is that it must be kept up for at least three years and preferably for a longer time. It is, however, a procedure which may be discontinued and can result in recovery and full expansion of the diseased lung. Artificial pneumothorax is perhaps the simplest of the surgical compression methods and can be applied safely to advanced cases even to those with laryngeal and intestinal complications. Improvement in the contralateral lung has been noted by Peters, Loomis Sanatorium, in 7%, and progress of disease or exacerbation in this lung in 25% of the cases receiving successful

pneumothorax. Similar figures probably represent the results in the contralateral lung following thoracoplasty.

The same author reported 42% living after two to fourteen years and 24% of these were in satisfactory condition. Matson, reporting 1,004 pneumothorax patients, found 32% clinically well and 32% dead. In general, results from artificial pneumothorax are claimed to be twice as good as without this treatment. The Jacobaeus method of intra-pleural pneumolysis, improved and cleverly performed by Matson, has led to a slight increase in the successful results of pneumothorax. This technic applies chiefly to the string like adhesions. Kinsella believes the band type of adhesions are best studied by thoracotomy. If such adhesions cannot be severed, the hand can be inserted to squeeze down a cavity. Pneumothorax has saved many lives when administered to patients with pulmonary hemorrhage which could not be otherwise controlled. It has proved, too, an excellent remedy in tuberculous pneumonia. In patients with pleuritic effusion, which requires removal, sterile air should be introduced to replace the exudate.

Phrenicectomy is of more recent date, first advocated by Styertz in 1911, and it is perhaps too early to fully evaluate this procedure. Like thoracoplasty when once done it cannot be undone. Brilliant results have been seen including the healing of apical and basal disease. There have also been numerous disappointments and cavities have been noted to increase in size. Following this operation occasional complaints of distressing dyspeptic symptoms have been made, more frequent in left-sided cases. These may, however, be only temporary. Truesdale has well demonstrated, in moving pictures, the peculiar undulating motion of the diaphragms in dogs, after section of one phrenic. He has also pointed out the possibility of some displacement resulting at the lower end of the esophagus. Some patients have complained of a temporary difficulty in swallowing following this operation. Phrenicectomy is to be considered in patients, who, because of adhesions, cannot receive artificial pneumothorax. It is of value following pneumothorax to help in the absorption of pleural fluid and to reduce the thoracic cavity when re-expansion is allowed. It is also of value for pulmonary hemorrhage. Used as a preliminary to thoracoplasty, the extraction or crushing of the phrenic nerve has made this procedure more complete, and at times has saved the patient from the more severe operation.

Thoracoplasty is an operation limited to a small number of well selected cases. In the past there were few surgeons sufficiently skilled to undertake this operation. The mortality rates reported in the first two months following extrapleural thoracoplasty have been as high as 13%. The patients selected are those with little or no disease in the contra-lateral lung, those in whom pleuritic adhesions have prevented successful pneumothorax, those in whom large cavities or cavities near the surface would render the latter procedure dangerous, and those with a marked cirrhotic type of disease. The operation should be done in two or more stages, and some surgeons

advise operating first over the area diseased. If the upper lobe is diseased then the upper ribs are removed first, and vice versa. Alexander's statistical studies show cure resulting in over 36% of patients operated. Partial and lateral thoracoplasty have at times yielded excellent results. I cannot agree with those who would supplant all pneumothorax treatment by thoracoplasty. Thearle believes that thoracoplasty influences the disease more promptly and permanently and the patient is spared the long medical supervision demanded by pneumothorax treatment. In bilateral disease a combination of the several surgical procedures has at times been successful. Bilateral pneumothorax has been simultaneously induced. Our own results have been more favorable when pneumothorax has been given upon one side before started on the other. In some cases pneumothorax has been carried out on one side and phrenicectomy or thoracoplasty on the other. The degree of disease, the constitution of the patient, the skill of the individual surgeon, and the type of after care, are factors which make statistical deductions difficult and fallible. These factors are applicable to all methods of treatment. Some physicians will procure better end results by the rest treatment than others. With many, the complications of pneumothorax will not be as high as those reported above.

A tendency has been noted for some physicians well trained in tuberculosis to develop into thoracic surgeons. Such men better appreciate what patients can endure and understand the necessary after care.

In my experience, surgery in pulmonary tuberculosis does not markedly shorten the period of time that patients need most careful medical care. Whatever operative procedure is followed patients must have from three to five years of skilled medical observation.

It is to be hoped that surgery will aid still more in reducing the death rate from tuberculosis. Some 50% of patients discharged from sanatoria die within five years following their dismissal. It will be natural for patients to request surgical procedures which give promise of more rapid cure. Are we in a transition period leading to substitution of surgical methods for other rest measures? I think not. It must always be remembered that tuberculosis tends to relapse and that whatever method we adopt to secure rest of a diseased lung, the permanent cure cannot be greatly accelerated and several years are necessary to build up what is generally termed "resistance."

That so many excellent results have been obtained in patients who were poor surgical risks is a forecast that many patients in the future will receive compression therapy earlier than in the past. But the decisions to submit patients to surgical procedures must remain with the competent physician who knows tuberculosis and whose experience must dictate the measures to be followed.

The Limitations of Heliotherapy in Pulmonary Tuberculosis*

By Bernard Langdon Wyatt, *Tucson, Arizona*

In this discussion of heliotherapy in pulmonary tuberculosis from the standpoint of its limitations, it must be emphasized at the beginning that reference is made primarily to personal experiences under meteorologic conditions that prevail in Southern Arizona. No attempts at "generalizations" will be made for a number of obvious reasons, among which only one will be noted; i.e., that qualitatively and quantitatively these solar radiations are not identical with those at other latitudes and altitudes, not to mention the meteorologic variables peculiar to the desert.

Not only will all generalizations be omitted, but also, there will be no discussion of the comparative effectiveness, (from the standpoint of biologic reactions), of radiations from the sun and artificial sources of radiant energy.

The term heliotherapy will be used to describe the exposure of the surface of the body to the *direct rays* of the sun, although it is clear that such exposures necessarily involve indirect radiations from sky reflection as well as the influences of air currents. This question of indirect radiations and aerotherapy is of more than passing interest and there are some indications that the limitations of *direct heliotherapy*, which will shortly be considered, do not pertain to the same extent and degree to aerotherapy and the effects of indirect radiations from sky reflection.

The difference and distinction between *climatic rest-cure* and *direct solar radiations* are obvious, even though the difficulties to evaluating their separate effects are always great. These difficulties, together with the fact that pulmonary tuberculosis is a disease with a tendency to "self-healing" in many cases, are probably responsible, to a certain extent at the least, for the difference of opinion as to the *actual results* of heliotherapy in pulmonary tuberculosis that is reflected in the medical literature of this and other countries.

Some twelve years ago Rollier stimulated my interest in the possibility of using direct solar radiations as an important adjuvant to other measures in the treatment of pulmonary tuberculosis. In his experience, the patients treated by heliotherapy were those with the "surgical" forms of tuberculosis, whose clinical manifestations of the pulmonary form were of secondary importance and of the usual mild type with a tendency to rapidly become

*Presented at the Fourteenth Annual Clinical Session of the American College of Physicians, February 14, 1930, Minneapolis, Minn.

quiescent. Nevertheless, Rollier's views about the value of heliotherapy were those expressed later in the 1923 Oxford edition of his book in which he states:

"This book would be incomplete if so important a subject as pulmonary tuberculosis were to be ignored; to treat it adequately is beyond our power as our experience has been almost entirely confined to the surgical manifestations of the disease. We have, of course, had occasion to treat large numbers of patients who presented active pulmonary as well as surgical lesions (about twenty per cent of all cases), but hesitate to draw conclusions from them as they can hardly be considered as typical cases of pulmonary tuberculosis. . . . . It has been stated that heliotherapy is liable to produce haemoptysis and foci of congestion in the lung; although perfectly true that these results may be produced by prolonged exposure to sunlight, especially in hot, thundery weather, such accidents are easily avoidable if proper attention be given to technic. We have frequently found that with patients subject to hemoptysis a carefully controlled course of sun baths, far from increasing this tendency, caused it to disappear. . . . . Properly applied, I am convinced that heliotherapy would be a useful factor in the treatment of the great majority of cases of pulmonary tuberculosis."

We have here a declaration which has undoubtedly influenced many clinicians in the United States as well as in Europe. There are, as a matter of fact, numerous reports substantiating Rollier's opinion; but when these data are subjected to careful analysis they are frequently not entirely convincing.

During the past five years it has been my privilege to devote a great deal of time to the study of the results of direct heliotherapy in pulmonary tuberculosis under conditions permitting of the most careful control of dosage and methods of exposure. Almost every type and stage of the disease—with the exception of acute or rapidly progressive cases—have been represented and the results have been analyzed in a careful and critical manner. The work was started with the sole idea of finding out the facts and not to prove or disprove any pet theory. The progress of patients who did not receive direct solar radiations was studied for comparative purposes.

Patients with the so-called "surgical" forms of tuberculosis who also had clinical manifestations of pulmonary tuberculosis were excluded for the reason that in cases of extra-pulmonary involvement the lesion in the lung is usually of a mild type with a tendency to become quiescent rapidly.

In the original report on these observations, which appeared in Hospital Progress early in 1928, about three hundred cases of pulmonary tuberculosis were included. Subsequent analysis of these records, however, has resulted in the exclusion of one hundred cases in order that comparisons between the results of direct heliotherapy and climatic rest-cure might be made with greater accuracy.

It is clear that the series is too small for definite conclusions to be arrived at, but it is a matter of considerable interest that *the number of patients showing appreciable improvement that*

might be attributed solely to direct heliotherapy was negligible.

It was clearly demonstrated that, when carefully supervised, general irradiations do not tend to produce hemoptysis, but it was necessary to be constantly on the alert to keep the exposures below the point of stirring up focal reactions.

There were some indications that a few patients with chronic fibrosis might be benefited by indirect radiations from sky reflection, but it was obvious that direct heliotherapy had definite dangers unless properly supervised.

It was furthermore found that the mathematical precision with which attempts were made to measure dosage was impracticable, as well as unnecessary, and that a considerable variation in the amount of solar radiations was tolerated without any clinical manifestations whatsoever.

The results derived from direct heliotherapy in pleural tuberculosis were most gratifying; and this was also true of tracheo-bronchial lymphnode disease. Furthermore, it appeared that exposures to the direct rays of the sun were of great value in preventing the development of intrapulmonary lesions in cases of hilum tuberculosis and primary pleural involvement.

Sunlight, which was formerly used extensively in Switzerland for the treatment of pulmonary tuberculosis, has been given up almost completely and Jacquerod, after many years experience with several thousand patients, has discarded it entirely.

In a personal communication recently received from Mayer of Saranac Lake, he writes; "As to the use of direct sunlight in pulmonary tuberculosis, I think that most of the reports have not been on controlled cases, and, therefore, biased in its favor. We have given it a very fair trial here in the summer time, and only in the rarest instances was I convinced that it helped —just about the same as in the isolated case that responds to tuberculin. On the other hand, I have seen other exposures in these cases do real harm. The way I feel about it is this—when I think of extra-pulmonary tuberculosis I immediately think of light. On the other hand, when I think of pulmonary tuberculosis, I do not think of light.

We have constructed a pure quartz solarium at our new National Vaudeville Artists Sanatorium. I will, there, very thoroughly study with two physicists in our laboratory what these minimal doses of light will do in the wintertime in a thoroughly heated quartz solarium, to pulmonary tuberculosis; but I anticipate that rarely ever will the sunlight turn the tide in favor of the patient in a case of pulmonary tuberculosis that has otherwise been considered as an unfavorable case."

The Diagnosis of Pre-Clinical or Latent (Biological) Tubercle in Suspects and Contacts by Caulfeild's Inhibitive and the T. C. F. Reactions; Clinical Application*[1,2,3]

By W. E. Ogden, *Toronto, Ontario*

THE tuberculosis problem to the internist or practitioner today, is summarized in two questions.

1. Is there a specific cure in sight, if so, perhaps, we can wait for it?; if not then follows question—

2. Have we adequate means of anticipation and prevention?

Q. 1. is answered in the negative.

Q. 2. (we believe) can be answered in the affirmative.

This answer to Question No. 2, that we *have* adequate means of anticipation of tuberculosis and of its prevention appears a radical statement, but I think I can show you today, sufficient proof that with certain minor qualifications it is possible to reduce the incidence of this disease by one-half or three-quarters. May I elucidate. Infants and children known to be Contacts are tested by an accepted intracutaneous tuberculin test and are treated with success in Preventoria or by hygienic régime. I propose to show you here how adults, Suspects or Contacts, can be tested by serology and by the same treatment as given the children, prevented from developing the disease. In hydrophobia the incubation period of one month gives us time to vaccinate against the onset of the disease; in adult pulmonary tuberculosis with an incubation period of one to five years (which I can show you) we have time to forestall the disease even more certainly in some ways than in the child.

The qualifications mentioned above comprise only three factors:— 1. The difficult technique and interpretation of the serological tests and the resulting tardiness of the profession in accepting the deductions therefrom.

2. The ignorance of the public and its reluctance to face facts.

3. The unwillingness of the public to submit themselves to a sufficient num-

*1. Read in part before the Section of Pathology, Academy of Medicine, Toronto, February 26, 1926, under title of "The Interpretation of Serological Results in Tuberculosis over Periods up to Ten Years."

2. Read in part before the Academy of Medicine, Cleveland, November 15, 1929, under title of "Clinical Interpretation of Serial Serological Reactions, being Caulfeild's Inhibitive and the T.C.F., as Specific for Tubercle."

3. Read 'in toto' before the American College of Physicians, Minneapolis, Minn., February 14, 1930.

ber of examinations for a sufficiently long period of time.

In the consideration of tuberculosis, study of certain reactions of the blood serum are frequently of definite value. This is so in four classes of patients and of relative value in the order named.

Firstly:— those whose clinical picture resembles that of tuberculosis, frequently called Tb. Suspects.

Secondly:— those who have been recently exposed to massive infection by the Bacillus tuberculosis, commonly known as Tb. Contacts.

Thirdly:— definitely tuberculous patients in the stage of activity.

Fourthly:— definitely tuberculous patients arrested or apparently cured.

The two serological reactions I refer to, are the Tuberculo-Complement Fixation and Caulfeild's Inhibitive. My comments are based on:— observations before the war at Muskoka Hospital, since the war at the Dept. of Pensions and National Health Chest Clinic with an annual attendance of 6000, my own clinic at the Western Hospital with an annual attendance of 2000 and my own patients; the latter supply most of the examples to be given today. The total number of tests in our group of five clinicians is 25,000.[1 2 3]

Before proceeding to discuss the practical interpretation of serological reactions in actual cases, several qualifications or limitations must be stated. The *technique* of the inhibitive appears to be more difficult than that of the Wasserman and I must remind you that many internists will not accept a single Wasserman report unless it coincides with their clinical conception of the particular case. They send a second specimen to another laboratory. (I recall several of my own mistakes in the interpretation of the Wasserman reaction).

Four years ago Perla of Philadelphia attacked the validity of these reactions as serological tests and consequently felt our clinical interpretation was not correct.[4] On the contrary Dr. Norwich of Toronto in the January number Amer. Rev. of Tuberculosis confirms the original observations on the specificity and reliability of the tests.[5]

It seems to have been forgotten that the late Dr. Ray Hodge succeeded in carrying out this inhibitive test independently of Caulfeild. Also the last article on the technique from the Connaught Laboratories was by Hodge and MacLennan.[6]

The *interpretation* of both Inhibitive and Fixation reactions also presents difficulties. This is caused by the frequently varied successive reactions in the same positive case of Tuberculosis. *If one accepts* that the variations in the Inhibitive reaction are indicative of varying immunity in the tuberculous patient the difficulty is minimized. When Caulfeild evolved the Inhibitive he first regarded it as indicative of immunity.[7 8]

It follows, therefore, that for definite aid in the study of a case, *a series* of serological tests *may be* necessary, rather than one or two, and is to be looked upon as the only way of properly employing the tests. It is exactly in this particular point that we find fault with the critics of these tests, that they have been content to judge on a single reaction.

The tests, therefore, are of *primary* value and easier interpretation for diag-

nosis, in clinics or institutions dealing with suspects and contacts. They are of *secondary* value and more difficult interpretation, in prognosis, in Sanatoria or to Clinicians having to decide upon the future course of an arrested case, or upon whether radical measures such as pneumothorax or thoracoplasty are advisable.

The Dept. of Pensions and National Health Chest Clinic then has use for the reactions in three classes out of the four—in all classes excepts Contacts.[9] The *Civilian Chest Clinic* can use the tests in all four cases.

The possible value to Insurance Companies should also be considered. A man is refused insurance by most companies until one year has elapsed after his wife's death from tuberculosis. According to our observations, this is the very time when the disease (tuberculosis) should be looked for in the contact. In several hundred closely watched adults we have not yet found demonstrable tuberculosis under 15 months after exposure. The incubation period in our series we would say varies from one to five or seven years.

As to their value in surgical tuberculosis, Dr. Horace Macintyre's paper read before the Ontario Laennec Society in 1926 showed 95% positive reactions in definite tuberculosis.

The inhibitive and T. C. F. are totally different. In many cases we do not expect to get a positive *inhibitive*. It is also regrettable that there are examples of tuberculosis in which the *fixation* does not occur.

We obtain, as you will see in my examples, totally different serological graphs in different clinical pictures, and we think they coincide.

In no post-mortem examination at Christie Hospital have we been shown to be wrong in our written opinion.

In our anxiety to arrive at the most accurate interpretation of these reactions, it may be worth while giving some of the ten points outlined by myself in 1924 at Ottawa, noting at the same time what modifications, if any, we might make five years later.[10] I will throw these on the lantern screen that they may be more carefully studied.

After these are shown I shall display also on the screen, x-ray pictures of pulmonary cases and their graphic serological charts, to give examples of (the two) the classes of patients in which serology most frequently assists.

Please note, as my confrére, Dr. Caulfeild has said, that we place serology alongside of other forms of examination as just another aid. Would we rely on that recent and valuable method of examination—the X-ray Stereo-Picture, to the exclusion of history taking or physical examination? The Roentgenologists would agree with our answer, 'Certainly not.' Neither would we be *without* the X-ray. Just so, serology in our experience has its own definite place of value.

[11]Allowing that certain reaction combinations must be interpreted differently in different clinical pictures, I would say that we regard the combined inhibitive and tuberculo-complement fixation as specific reactions and as helpful in the diagnosis and prognosis of tuberculosis.

In all cases of suspected tuberculosis, I draw blood for these tests and would here state some particular points to be noted in the interpretation, to-

gether with the chief limitations in their use.

As you may know, the results of the inhibitive test are reported from the laboratory in the phraseology of "First," "Second," or "Third" class or more rarely "Negative" Inhibitive. The fixation is reported in units of complement fixed, the fixation of 2, 2½, or 3 units being regarded as positive.

Point 1. Any or all of these may occur in the tuberculous, but only third-class and negative inhibitives occur in the normal, and the third-class is always found in the normal adult. When the apparently normal adult gives any reaction varying from third-class, we are open to suspicion of tuberculosis.

Point 2. If the result is second or first-class inhibitive I take it as strong support to a suspicion of tuberculosis and believe that biological tubercle exists. If clinical symptoms or signs obtain simulating tuberculosis, I assume the presence also of clinical disease. It may be present to ever so slight an extent and may not be otherwise demonstrable.

Point 3. A third-class inhibitive with negative fixation, lends support to the exclusion of tuberculosis but a single negative has little influence on my opinion, if I have already made a probable diagnosis of tubercle. As in other tests, a single negative tells us very little. The more often the same reaction occurs, the more valuable becomes this negative finding.

If opportunity is afforded to repeat these tests once a month and if there is no variation from third inhibitive and negative fixation in successive tests, then my previously assumed opinion regarding the presence of tuberculosis is materially shaken.

I may say (here) that the originator has now finished five years serial observation in seventy clinically normal medical students.[9]

Point 4. If in addition to a second-class inhibitive a positive fixation is obtained, the probability of tuberculosis is changed to one of presumability.

Point 5. Slight variations from the normal negative fixation have little influence on the diagnosis of no tuberculosis. Positive fixations indicate the presence of tuberculous disease or that the individual has been recently tuberculous, and that he is yet reacting to tubercle, though it may not be clinically demonstrable.

Point 6. Negative inhibitives in the adult are in themselves suggestive especially if repeated or if devoid of laboratory error, if accompanied by positive fixations, they lend material support to the diagnosis of tuberculosis and with a strong positive fixation are still harder to ignore.

Point 7. In a positive reaction, viz., first or second class inhibitive, we feel safe in assuming, as stated above, that tubercle is a biological, if not a clinical factor, and also that in the majority of cases if given the opportunity we can demonstrate tuberculosis later.

In a small percentage we have not been able to demonstrate the disease. This you will agree is to be expected, in that they make their own cure occasionally, before they would manifest it clinically. You must be reminded that Caulfeild has consistently said that marked inhibitive reactions never necessarily mean clinical tuberculosis.

Point 8. Ten years ago Caulfeild drew my attention to abnormal serological reactions in contacts. Since then I have made observations on several hundred cases. Variations from negative fixation to straight positive occur in those exposed to massive infection with open cases. Abnormal inhibitives also frequently obtain. This indicates only biological tuberculosis and precedes clinical tuberculosis, unless these patients have sufficient immunity to succeed in overcoming a biological attack.

Point 9. Marked inhibitives and positive fixations tend to fade out as tuberculous disease disappears, the former usually being the first to fall while the latter may obtain for years.

In the 'cured' we believe these reactions are absent.

Point 10. Comparing the value of the inhibitive test with the fixation in clinical application, we agree with Caulfeild that *the inhibitive is definitely the more valuable.* At the same time, we would not be without the fixation, particularly if we are looking for a diagnosis and if only one blood has been tested.

For instance, with only one or two successive tests, we may find nothing more than variations in the fixation. This would encourage us to repeatedly test the blood to discover whether any strong inhibitive reactions occur. In this way variations in the fixation give us rather a lead or a suggestion than a diagnosis."

EXAMPLES.—I shall give ten examples of the tuberculosis suspects class in which serology was of greatest value. It will be noted that I have deliberately chosen cases in which at first examination and survey no positive diagnosis could be made by examination of sputum or discharges and when obtainable, stereoroentgenograms.

Of the ten cases, eight gave a strong lead towards tubercle by positive serological reactions. Of these eight, four later showed tubercle bacilli in the sputum, three showed definite X-ray lesions in the chest and one showed a caseous tuberculous lesion at autopsy. The remaining two of the ten examples gave a strong lead against tubercle by repeated negative serological reactions. In both of these a satisfactory diagnosis other than tubercle was finally made.

Case 1. (S. H. dietitian) Detroit Hospital, grippe and basal bronchitis June 1928, unsatisfactory convalescence, referred home for observation and rest. Stereos by Dr. Ruschlander, Harper Hospital, Detroit, showed diffuse abnormal shadows left base. Stereos a month later by Dr. W. C. Kruger, Toronto Western Hospital, showed these abnormal shadows largely cleared. T.C.F. positive in three tests during next two months, because of which I urged greater efforts to procure sputum. Tubercle bacilli found twice and several times following year at Queen Alexandra Sanatorium under Dr. F. H. Pratten.

Case 2. (Mrs. Bau. graduate nurse) three years observation as tuberculosis suspect, five successive double serological reactions negative—Caulfeild's Inhibitive and the T.C.F. April 1924, I referred her as probable goitre, B.M.R. 118%, operation by Dr. R.V.B. Shier. Pathological report "diffuse hyperplastic goitre with slight colloid retention" Dr. W. L. Robinson, Toronto General Hospital.

Case 3. (Mr. P.) Feb. 1920 patient said diagnosis of tuberculosis made and tubercle bacilli found at Minneapolis. P.S. and stereos scarcely suspicious. Caulfeild's In-

hibitive positive in two successive tests. Second X-ray April 1921 still not positive. Finally letter dated Jan. 2, 1923 from Dr. Harley J. Gunderson, Minneapolis, confirmed finding of tubercle bacilli July 23, 1919.

Case 4. (C. A.) referred by Dr. Marchant B. Whyte, laryngologist, Feb., 1923, rhonchi rt. lower, no fever, wt. 160, no suggestive symptoms. T. C. F. positive, (2½ units fixed) because of which I ordered stereos. One inch cavity rt. lower lobe midzone diagnosed tuberculosis by Dr. Gordon E. Richards, roentgenologist, Toronto General Hospital. After nine months at Calydor Sanatorium under Dr. C. D. Parfitt abnormal X-ray shadows cleared.

Case 5. (Miss S. E.) April 1926, slight fever, under 100° F., undue fatigue, no satisfactory cause found. Dr. Joseph A. Gilchrist asked would I give an opinion on one serological test and history without seeing the patient. Inhibitive and fixation both found positive whereupon I wagered ten to one tuberculosis and two to one stereos would demonstrate same; cherry sized lesion shown in both uppers and midzones.

Case 6. (Rempell) referred Dec., 1924, by Dr. I. H. Erb, pathologist, H. C. S. Slight fever, cough, sputum negative three times, stereos—left mid-lung lesion bronchiectasis or tuberculosis, not diagnostic of latter in X-ray per se, Dr. W. Howard Dickson, roentgenologist. Serology positive inhibitive, whereupon I urged twenty sputum tests. Fifteenth and seventeenth tubercle bacilli plus. Patient sent to Waterloo County Sanatorium under Dr. E. N. Coutts.

Case 7. (M. G. J.) Cervical and axillary adenitis discharging, five years, discharge negative for tubercle bacilli and guinea pig negative. Five physicians considered condition tuberculosis, five not. Being called at this stage and there being no lung symptoms nor signs, I first did serology thinking it might decide the diagnosis for me. Obtaining positive inhibitive, I at once advised sanatorium. Before leaving, stereos were taken and showed definite minimal parenchymal apical lesion, Dr. W. C. Kruger, roentgenologist. Gained fifty pounds at Muskoka Sanatorium with rest and heliotherapy under Dr. W. B. Kendall, adenitis subsided, discharge stopped.

Case 8. (Flah. D. P. & N. H. Canada) tuberculosis suspect four years. Six double serological reactions negative, sent to Calydor Sanatorium for observation. Dr. C. D. Parfitt demonstrated definite basal bronchiectasis by lipiodol and X-ray stereos, 1928.

Case 9. (R. M.) returned soldier patient in my hospital Spadina Military, 1918, bronchitis, 1920, Dept. Pensions & National Health Canada, bronchitis. Tuberculosis suspect. Caulfeild's Inhibitive positive twice. Tubercle bacilli absent, later diagnosed no clinical tuberculosis but marked pulmonary emphysema. In 1929 terminal pneumonia, autopsy showed pneumonia and caseous tuberculous lesions, Dr. G. W. Lougheed, pathologist, Christie Hospital.

Case 10. (H. O. C. wife of physician) 1914, bronchitis acute and chronic off and on twenty years and more, sister died of tuberculosis in same house 1885. X-ray advised and declined. P. S. of bronchitis but percussion note R. upper impaired. 1920 bronchitis acute, fever, small haemoptysis. When called in having been refused X-ray previously, had serology done. Finding positive I urged stereos. Lesion shown by discrete opaque shadow with surrounding fibrosis. R. upper etiology definitely tuberculosis (Richards.)

Summary

1. In 20 years clinical observations with 5000 different cases and 25,000 double serological tests in a group of 5 clinicians, we believe we have laboratory aids in the recognition of latent tuberculosis in the adult, by Caulfeild's Inhibitive and the T. C. F. as specific for tubercle.

2. These tests in the adult are comparable in value to the universally ac-

cepted intracutaneous tuberculin test as diagnostic in infants.

3. The technique of the tests is more difficult than the Wasserman, but can be carried out with results just as constant if the additional care is exercised.

4. Clinical interpretation although seemingly difficult is easy when we apply what we already know of the latency or the possibilities of biological or potential tuberculosis.

5. Their value has been proven in hundreds of cases of suspect Tb.

6. Their most dramatic value is seen in Tb. Contacts. By means of positive tests we have diagnosed latent tuberculosis two years before clinical disease and one year before even demonstrable by x-ray.

7. The incubation period in the adult is from one to five years.

8. In the diagnosis of pre-clinical tuberculosis we are in a most advantageous position to forestall actual disease, therefore, the question arises, can we not reduce annual expenditure in municipal orders in Sanatoria and private costs by hundreds of thousands in our large cities, because with such facilities we might conceivably decimate the present incidence as well as the present death rate.

In conclusion let me repeat that there are special classes of Tb. patients where serology is of value and I have shown you exactly what assistance we expect to obtain. I use the word "exactly" here, not advisedly in the accepted meaning, but for the purpose of qualifying it. The practitioner of medicine, who is looking for a method by which he can throw in a specimen, turn a crank, and produce an exact clinical diagnosis will still be looking for that method at Domesday.

In an address I gave to the Saranac Group February, 1926, Petroff said that he would be only too pleased if there were such a test, and I agreed they would never get it.

No single sign nor symptom is diagnostic 'per se' of clinical tuberculosis. The whole picture of the symptom complex must be studied.

May I add I am deeply appreciative of the laboratory facilities afforded me first for eight years by Professor Fitz-Gerald of the Connaught Laboratories and Dr. Caulfeild in charge of the Christie St. Hospital Chest Clinic, latterly by Dr. Lougheed and Dr. Norwich of the D. P. & N. H. Laboratory at Christie Hospital, also of the cooperation of Dr. G. E. Richards and Dr. W. C. Kruger with their X-ray departments. My sincere thanks for facilities and interest are due Dr. W. C. Heggie, Chief of the Outdoor Department and for support and encouragement from Dr. F. Arnold Clarkson, Chief in Medicine, Toronto Western Hospital.

Part II. Examples of contacts with serological graphs and X-rays will follow shortly in the "Annals."

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The Problem of Syphilis in a Tuberculosis Clinic*†

By Alvis E. Greer, M.D., F.A.C.P., *Houston, Texas*

THIS report of the incidence of syphilis in a tuberculosis clinic is intended to deal primarily with the problem of the presence of syphilis in any form and not with the problem of pulmonary syphilis per se. The position is taken herein that the evidence found as to the presence of pulmonary syphilis is insufficient to warrant the making of such a diagnosis in any of the cases in our series. However, some attention has been given in this paper to the subject of pulmonary syphilis as reflected in the present-day literature.

Before the complement-fixation test for syphilis became generally used, it was the opinion of physicians that syphilis of the lungs was exceedingly rare; whereas, since the complement-fixation test has become more widely used, there seems to be an increasingly prevalent idea among clinicians that syphilis of the lungs occurs more frequently than was formerly thought. There is a marked variation between the clinical impression of the prevalence of lung syphilis and the opinion gained from autopsy findings. This difference of opinion may be explained in that the tendency of the pathologist to diagnose tuberculosis in preference to syphilis is because he is loath to diagnose syphilis unless treponemata can be demonstrated in the pathologic sections. There seems to be some hesitancy on the part of the pathologist to adequately differentiate histologically between a gumma and a tubercle when it is found in the lungs. As syphilis of the lungs has been presumed to be rarer than tuberculosis, there is a tendency to decide in favor of the commoner lesion, tuberculosis.

Howard estimated in 1924 that there were 200 cases of pulmonary syphilis reported in the literature. Osler has reported syphilis of the lungs occurring only 12 times in 2,800 autopsies at the Johns Hopkins Hospital, 8 of these cases being of the congenital type. Funk found the condition 4 times in 1,200 cases. Howard diagnosed syphilis of the lungs in 7 cases out of 11,982 general hospital admissions. Brock reports finding that 35 per cent of 7,660 consecutive South African negroes had a fibroid condition of the lungs, due to syphilis, among a population, however, of which 80 per cent showed some evidence of syphilis. Out of 3,000 autopsies at the Massachusetts General Hospital, Lloyd found only 1 case of acquired pulmonary syphilis. Between

*Read before The Texas State Public Health Association, Houston, Texas, April 30, 1930.

†From the Houston Anti-Tuberculosis League Clinic, Houston, Texas.

the years of 1908 and 1923, at the Massachusetts General Hospital, there were 5 cases of pulmonary syphilis recorded. Between 1903 and 1916, the out-patient department of the Massachusetts General Hospital recorded 8 cases of pulmonary syphilis, while in nearly 5,000 autopsies at the Massachusetts General Hospital, pulmonary syphilis was found only in 1 instance. Watkins, from the roentgenological viewpoint, reports that in 6,500 cases syphilis of the lungs was diagnosed in 169.

Habliston and McLane, in reviewing the anatomical diagnoses in 2,860 autopsies from the combined services of the Baltimore City Hospital, found evidence of visceral syphilis demonstrated in 309 cases; 5 anatomical diagnoses of syphilis of the lungs had been made, and one of these cases was a congenital one. Landis, Funk and Gibbs are of the opinion that syphilis of the lungs occurs more frequently than is diagnosed. Landis reported 3 cases from the records of the Phipps Institute and 2 cases from the White Haven Sanatorium. Funk found 4 instances in 72 non-tuberculous lesions of the chest, and Gibbs reported 7 cases of pulmonary syphilis. The diagnosis of pulmonary syphilis in the above report was suggested largely by the occurrence of a positive Wassermann reaction and, further, because the cases were given a therapeutic test on specific treatment and showed marked improvement in their symptoms and pulmonary findings. In this connection, it is suggestive that Barlaro has reported 3 cases of advanced pulmonary tuberculous disease which improved under antisyphilitic treatment. Funk states that Watkins has affirmed that syphilis of the lungs is not as rare as is ordinarily believed.

The coexistence of syphilis and tuberculosis has been noted quite frequently, as would naturally be expected, because of the widespread occurrence and rather universal prevalence of the two diseases. Table 1 taken from Hollander and Narr, who

TABLE 1

Investigation	No. of Patients	No. Positive	No. Probably Syphilis	Pos. Percentage	Total Percentage
Lettule, Bergeron and Lepine	346	64	—	19.0%	19.0%
Vedder	211	36	17	17.0%	23.2%
Snow and Cooper	290	44	14	14.0%	20.0%
Lyons	471	29	12	6.2%	9.2%
Jones Dispensary	251	—	73	—	29.0%
Jones Hospital	189	18	—	11.0%	25.0%
Petroff	376	—	82	—	21.8%
Ford	328	6	22	2.0%	8.0%
Collectanea	175	14	9	8.0%	13.1%
Cooper	2794	181	—	6.5%	6.5%
Day and McNutt	893	102	107	11.3%	28.4%
	6324	494	336	10.36%	17.81%

quote from Vedder, Day and McNutt, shows the coincidence of tuberculosis and syphilis very clearly.

The diagnosis of pulmonary syphilis has generally been made on the basis of the Wassermann test, the evidence of syphilitic disease elsewhere in the body, repeatedly negative sputum analyses for tuberculosis, and the great improvement of the patient under specific therapy. From the table 1 it is to be noted that 2 per cent and 19 per cent represent the two extremes of the association of syphilis and pulmonary tuberculosis, and that the average is 10.36 per cent.

Pathologically, syphilis of the lower respiratory passages has been quite thoroughly classified. Syphilis of the trachea and bronchi, according to Conner, has four main types, as follows:

(1) Gummatous swelling of the trachea or bronchi, which swellings may be either circumscribed or diffuse throughout;

(2) Ulcerations, which occur singly or multiple, and with all possible variations;

(3) Endotracheal, connective tissue newgrowths which are seen either as distinct scarring or a diffuse thickening;

(4) Fibrous peritracheitis, occurring as masses of dense fibrous tissue, developing outside the cartilaginous ring.

Lesions of the lungs proper, in acquired syphilis, may occur in one or more of three forms:

(1) As a diffuse or local induration, which appears as an interstitial process, observed particularly in the peribronchial and interlobar connective tissues, which runs through the lungs from the hilus to the base in the form of strands. These seems to be a tendency for more of this to occur on the right than the left side, and the indurative lesion is usually associated with bronchiectatic areas, caused by obstruction of the bronchi.

(2) As gummas, which are less frequent than the indurative type of syphilitic lesion in the lungs, and when found are usually associated with indurated lesions. The gummas occur as masses, which vary in size from tiny nodules up to the size of an egg, and are usually situated near the hilus or in the lower lobe, and are always associated with marked fibrous tissue proliferations. In the course of time the gummas degenerate and caseate, and later become replaced by firm scar tissue. In this way large bands of connective tissue may be seen to run throughout the lungs. Because of the fact that the masses of connective tissue compress the bronchi, a rather general and diffuse bronchiectasis results. Occurring at times in the gummatous form of pulmonary syphilis, and almost always with the indurative type, it is seen that the walls of the blood vessels are thickened and the blood vessels become obliterated. From this condition the pulmonary circulation may be seriously hampered, because of the extensive fibrosis, and the right side of the heart may become considerably enlarged. However, it must be stated that extensive fibrosis throughout the lungs is not definitely pathognomonic of syphilis.

(3) As a gelatinous pneumonia or the so-called "white pneumonia". This condition is evidenced by considerable desquamation of the alveolar cells and

a generalized induration of the lung. The lungs are large, firm and white. Microscopically, the alveolar epithelium is found to be cubical in form, and the alveoli are filled with desquamated epithelial cells, a few leukocytes and a few mononuclear cells; the alveolar septa are greatly thickened, and there is marked proliferation of connective tissue about the bronchi and blood vessels, the walls of which are greatly thickened and their lumens obliterated.

During the secondary stage of syphilis there may be a rather generalized catarrh of the tracheal and bronchial mucous membrane and some increase in the hilus and lymphatic glands.

Symptoms of Lung Syphilis

In the congenital form of lung syphilis the patient is born dead or dies shortly after birth and, therefore, there are no special symptoms characteristic of the pulmonary disease per se. In the secondary stage of syphilis there is a moderate degree of bronchial catarrh with some cough and slight mucopurulent expectoration, due to syphilitic lesions of the bronchial mucous membrane. In the tertiary stage there are no definitely charactertistic symptoms of lung syphilis. It is usually assumed that the disease is presumably present when tuberculosis is either partially or wholly excluded, a positive Wassermann test has been obtained, the sputum has been repeatedly negative for tubercle bacilli, and the correctness of the diagnosis tested by definite improvement under specific treatment for syphilis. Lung syphilis is more commonly found in the middle and lower portions of the lungs, leaving the apices free. This is not always the case, however, as the disease has been found, at times, involving the apices of the lungs. As a rule, gummas are found near the hilus or in the middle or lower portions of the lungs.

The presence of slight deterioration in health, with fever over a long period, the constant absence of tubercle bacilli in the sputum, associated with marked dullness over the lungs, either locally or diffusely, with considerable decrease in the lung sounds and relatively few râles, point suggestively toward the possibility of pulmonary syphilis. Symptomatically, the disease occurs in the acquired tertiary stage as a subacute form which simulates ulcerative phthisis, and, secondly, as a chronic form similar to the fibroid type of pulmonary tuberculosis.

In the subacute form of pulmonary syphilis, there is found considerable dyspnea, a moderate degree of fever, less marked than in pulmonary tuberculosis, a moderate degree of loss in weight and strength, and a fair amount of cough and cyanosis. Hemoptysis is relatively infrequent.

In the chronic form of pulmonary syphilis there may be comparatively few symptoms, presenting only a moderate cough with slight expectoration, with moderate deterioration of weight and strength. However, it is in this type of chronic pulmonary syphilis that there is considerable induration throughout the lungs, that bronchiectasis frequently develops, and because of which there may appear the physical signs of cavitation. The sputum may become putrid, and the patient may develop an irregular septic temperature and become markedly emaciated and sick. It is to be emphasized that there

is a tendency towards less cough, less fever and less deterioration in weight and strength than is usually found in pulmonary tuberculosis. The disease runs a more protracted course than the average case of pulmonary tuberculosis. Fowler gives the following differentiation between pulmonary tuberculosis and pulmonary syphilis:

"(1) Tuberculosis usually affects the apex of the lung and subsequently the apex of the lower lobe, and tends to progress in a certain route. The primary lesion of pulmonary syphilis is often about the root and central part of the lung, and the disease follows no definite route of march, and gummas may be found in any position.

"(2) Both tuberculous infiltrations and gummas may undergo necrosis and caseation or fibrous transformation; but with the caseous tubercle the tendency towards softening and cavity formation is the rule, whereas a caseous gumma rarely breaks down.

"(3) The progressive destruction of the lung by a process of disintegration, leading to a gradual increase in the size of a cavity, a change so commonly observed in tuberculous disease, is rarely if ever observed in syphilis, except as a secondary result of stenosis of one of the main bronchi.

"(4) In nearly all cases of advanced destruction of the lungs, occurring in the subjects of syphilis, stenosis either of the trachea or of one of the main bronchi is present, whereas the lesion is very rare indeed in tuberculosis.

"(5) The cavities found in cases of pulmonary syphilis are usually bronchiectatic but not invariably so; whereas, in tuberculosis they are commonly due to progressive destruction of the lung but may be bronchiectatic.

"(6) The tendency to the formation of pulmonary aneurysm, which is so marked a feature in tuberculosis, is rarely observed in pulmonary syphilis.

"(7) Pulmonary lesions in tuberculosis are very common, whereas in syphilis they are extremely rare."

The diagnosis of pulmonary syphilis rests mainly upon a history of syphilis, the repeated absence of tubercle bacilli in the sputum, the presence of syphilitic manifestations elsewhere in the body, the absence of toxic symptoms commensurate with the degree of pulmonary changes, and a positive Wassermann reaction, and by the improvement of the general symptoms and the local manifestations of the disease under specific therapy.

In our investigation of 1944 patients the diagnosis of syphilis was made by the complement-fixation test. Two hundred and forty-two positive Wassermann reactions were found in these cases; 191 cases showed four plus positive reactions, 22 cases showed three plus reactions, 26 cases, two plus reactions, and 3 cases, one plus reactions. In many cases, the Wassermann reaction was checked by the Kahn test. It may be argued that the three, two and one plus Wassermann blood tests should be excluded, but it is not within the scope of this paper to discuss the relative value of a three, two or one plus Wassermann blood test in the diagnosis of syphilis. The discussion is concerned wholly with the cases which showed any evidence of the disease.

In studying table 2 it is to be seen that 51 per cent of the total number of

TABLE 2—SHOWING PROPORTION OF CASES WITH TUBERCULOSIS IN THE DIFFERENT RACES

Total number of patients examined	1944
Caucasians examined	1279
Negroes examined	298
Mexicans examined	367
Tuberculous cases	982
Non-tuberculous cases	962
Caucasians	
Tuberculous	630
Non-tuberculous	649
Negroes	
Tuberculous	160
Non-tuberculous	138
Mexicans	
Tuberculous	192
Non-tuberculous	175

patients examined received a diagnosis of pulmonary tuberculosis. In the two races, namely, the negroes and the Mexicans, in which we would expect to find the greatest amount of syphilis, the relatively largest percentage of tuberculosis of the lungs was found.

It is interesting to note in table 3 the relatively greater number of positive Wassermann reactions in the tuberculous patients, contrasted with its presence in the non-tuberculous individuals. This is especially striking when it is remembered that there were 962 non-tuberculous cases and 982 tuberculous cases examined. Although the tuberculous and non-tuberculous cases were almost equal in number, it is seen that the total number of positive Wassermann tests in the tuberculous cases was 156, whereas in the non-tuberculous only 86 cases showed a positive reaction.

In table 4 it is to be emphasized that no effort is made to give the symptoms enumerated as those of pulmonary syphilis. It is my intention to merely record the symptoms complained of in

TABLE 3.—CONTRASTING THE PRESENCE OF THE POSITIVE WASSERMANN REACTION IN TUBERCULOUS AND NON-TUBERCULOUS PATIENTS

	No Positive Wassermann Reactions
Caucasians	
Tuberculous	61
Non-tuberculous	38
Negroes	
Tuberculous	63
Non-tuberculous	29
Mexicans	
Tuberculous	32
Non-tuberculous	19
Total	
Tuberculous	156
Non-tuberculous	86

TABLE 4.—SYMPTOMS OF 86 NON-TUBERCULOUS PATIENTS WITH POSITIVE WASSERMANN TESTS

1. Cough and expectoration	
(a) Dry	30 cases
(b) Productive	28 cases
(c) Bloody	9 cases
2. Loss of weight averaging 10 pounds	39 cases
3. Fever, afternoon type—99°-101° F.	53 cases
4. Night sweats	21 cases
5. Pain in chest	57 cases
6. Weakness (moderate)	70 cases
7. Dyspnea	46 cases
8. Hoarseness	36 cases

the 86 non-tuberculous cases which gave a positive Wassermann test for syphilis. It is not to be assumed, necessarily that any of these patients had pulmonary syphilis; many of them showed no abnormal signs on physical examination, except a few scattered râles throughout the chest. The majority of the patients received antisyphilitic treatment and recovered rapidly of their symptoms. In two cases only did I feel justified in making a diagnosis of pulmonary syphilis, which diagnosis was made on the basis of repeatedly negative sputum analyses, a positive Wassermann blood test for syphilis, and the clearing up of symptoms under specific therapy. Space will not permit a detailed report of these two cases. I cannot help but believe, however, that more of the 86 non-tuberculous patients probably had pulmonary syphilis.

Table 5 shows clearly that, in the series of 1944 patients examined, there was a larger percentage of positive blood tests for syphilis in the tuberculous than in the non-tuberculous cases; a positive Wassermann test being present almost two times more frequently in the tuberculous cases than in the non-tuberculous ones.

TABLE 5.—PERCENTAGES OF PATIENTS SHOWING POSITIVE WASSERMANN TEST

Total cases examined (1944)	12.4%
Caucasians examined (1279)	7.7%
Negroes examined (298)	30.9%
Mexicans examined (367)	13.8%
Tuberculous cases (982)	15.8%
Caucasians (630)	9.7%
Negroes (160)	39.3%
Mexicans (192)	17.2%
Non-tuberculous cases (962)	8.9%
Caucasians (649)	5.8%
Negroes (138)	21.0%
Mexicans (175)	10.8%

Syphilis is seen to be especially frequent in the tuberculous negroes and in the tuberculous Mexicans.

In table 6 it is noteworthy that there were considerable evidences of improvement in the tuberculous cases

TABLE 6.—RESULT OF TREATMENT FOR SYPHILIS

1. In the tuberculous cases:	
(a) Number treated	33
(b) Result:	
Improved	27
Unimproved	4
Dead	2
2. In the non-tuberculous cases:	
(a) Number treated	31
(b) Result:	
Improved	30
Unimproved	1
Dead	0

treated. Incidentally, it may be said that the treatment consisted largely of the use of neosalvarsan and mercury. In the fatal tuberculous cases, I am under the impression that death was greatly hastened by the treatment, as the patients became rapidly worse after it was begun and died soon thereafter.

Comment

As has heretofore been emphasized, it is not my purpose in this investigation of only 1944 cases, to attempt to draw any definite conclusions whatever. If this brief study will call attention to the possibly greater prevalence of syphilis in tuberculous patients than is generally acknowledged, we shall feel well repaid. The cases were checked by roentgenological examination of the lungs, repeated sputum analyses, and the complement-fixation test for syphilis. The tests were made on patients, applying at a clinic for diseases of the chest, and who usually presented the symptoms of cough, loss of weight, afternoon fever and weakness.

David L. Belting has given the statistics of thirty-two authors in different cities of the United States and Europe, showing 8.49 per cent of 21,257 patients were infected with syphilis; however, he did not limit his investigation to cases of pulmonary disease only. Pusey has stated that 5 per cent of all male adults and 1 per cent of all female adults have syphilis, which would mean that more than 3 per cent of the entire adult population of the United States has syphilitic disease. In my study it was found that 12.4 per cent of all the patients examined, whether tuberculous or not, had syphilis; this percentage, of course, was higher because one-third of the cases was made up of negroes and Mexicans. The percentage of positive Wassermann reactions in the total Caucasians examined (7.7 per cent) is practically the percentage given by Belting for the incidence of syphilis in the United States and Europe. One of every three negroes and one of every seven Mexicans showed evidence of syphilis. A positive Wassermann test for syphilis was found to be present 60 per cent more frequently in the tuberculous Caucasians and Mexicans than in the non-tuberculous Caucasians and Mexicans; the Wassermann test was found to be positive more than two times more frequently in the tuberculous negroes than in the non-tuberculous negroes. It is our impression that some of these cases had pulmonary syphilis and we hope to follow them long enough in the future to arrive at an opinion regarding that problem. At least we believe we may infer that the presence of syphilis renders a patient more liable to the development of pulmonary tuberculosis.

I am greatly indebted for the cooperation of my associate, Dr. Chas. E. Eversberg, and Miss Emmeline Renis, executive secretary of the Houston Anti-Tuberculosis League, in this study.

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The Use of Sodium Ricinoleate in Bacterial Hypersensitiveness of the Intestinal Tract: Clinical Results

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In previous comunications,[1,2] we have shown that sodium ricinoleate is capable of rendering bacterial antigens non-toxic. As evidence of this, we may cite the fact that an antigen which, when injected intradermally, produces a marked local reaction, is no longer capable of producing such reaction after treatment with ricinoleate. Larson[3] was the first to demonstrate this detoxifying action while working with the pneumococcus.

Among our private patients, we had encountered a large group, ranging from cases of chronic constipation to mucous colitis, in whom treatment had proved very unsatisfactory. Wherry[4] had shown that the intestinal tract may contain organisms to which the patient is highly sensitized, as shown by intradermal tests. With his work in mind, we began our treatment by administering castor oil daily, hoping that the conversion of the oil into ricinoleates in the intestinal tract might have a beneficial action through its detoxifying effect. The results were so encouraging—and the daily use of castor oil so distasteful to patients—that we had prepared for our use five-grain globules of sodium ricinoleate.* These capsules, taken three times a day before meals (and often a fourth at bedtime), we substituted for the castor oil, with even better results.

The treatment which we administered to a group of seventy patients consisted in the administration of the capsules of sodium ricinoleate, as mentioned above, and, in the great majority, we also used an autogenous vaccine which was administered daily. All other forms of treatment, such as diet, colonic flushings, etc., were purposely omitted, to avoid confusion in the interpretation of results.

The symptoms of which our patients complained were varied, being those attributed to so-called "intestinal autointoxication". Many had had operations on appendix or gall-bladder without relief of symptoms.

Pains in various parts of the body were frequent. Headache, neuralgic pains in the extremities, abdominal pains usually associated with gas, were common complaints. As a rule, the patients experienced marked relief within a few days after beginning treatment, and in many there was a cessation of the pain. In the patients

*These capsules, made by the William S. Merrell Company, and designated "Soricin", may be had in five-grain and three-grain sizes, the latter being used chiefly with children.

with severe headache, the effect was perhaps most noticeable. The severe crises of abdominal pain so often seen in mucous colitis were most strikingly affected in those suffering with this disease.

Lassitude and fatiguability were very common symptoms. Neutralization of the intestinal poisons and vaccination usually relieved them.

Distress from excessive gas formation occurred in the majority of our patients. We had previously tried to combat this by the use of lactose and Bacillus acidophilus. Our results in the present series of cases were much better than those which we had obtained previously. Patients stated at times that, if they had failed to continue the treatment for two or three days, they were reminded of their omission by a recurrence of excessive gas in the intestines. Many of our patients had also noted a very foul odor of the stools and had stated that this disappeared after treatment was started, in most instances.

Sodium ricinoleate, in the dosage of fifteen or twenty grains daily, has only a mild, if any, laxative effect. For the treatment of this symptom we depended for the most part on castor oil, though in some cases when there was a marked aversion to castor oil, we employed other drugs.

In the patients with mucous colitis, the effect of treatment was very striking. In addition to relieving them subjectively, there was a noticeable decrease in the mucus in the stools and finally an absence. In the one patient where mucus and abdominal distress returned while under treatment, a malignant neoplasm of the intestine was found and excised. Since the operation the patient has continued to obtain relief.

Anorexia, loss of weight, belching were often favorably influenced by treatment of the intestinal tract. There was not infrequently a gradual gain in weight, with a feeling of well-being, and a relief of the dyspeptic symptoms. The patients were able to play golf or carry out exercises which fatigued them formerly.

In this group of seventy patients, thirty were entirely relieved of their symptoms. In the forty patients remaining, the majority experienced great relief, though not entirely rid of symptoms. Whether patients may be permanently cured remains to be determined. In the cases of mucous colitis, it has been necessary to use the ricinoleate capsules indefinitely, and in all patients of this group there is a great tendency to recurrence of symptoms. This is in all probability due to the fact that the causative organisms cannot be removed from the intestinal tract, but remain a constant menace to the health of the individual. Recently Kline[5] has reported good results in the treatment of intestinal tuberculosis with sodium ricinoleate.

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Editorial

*THE NEWER THERAPEUTIC ATTACK ON CANCER**

The therapeutic attack on cancer is faced at the very outset with what seems to be an insurmountable barrier to its success; and that is shown in the essential nature of cancer itself. Cancer shows no tendency to spontaneous self-healing, as do all of the progressive chronic infective granulomas. Compared with tuberculosis, which in the great majority of cases shows a more or less decided tendency to spontaneous self-healing, there is on record no fully-proved and authentic instance of the spontaneous self-healing of any well-advanced or metastasizing cancer. This fact, in itself, places cancer in a category wholly apart by itself, and should be indicative of its wholly different nature and etiology. Against cancer the body defense mechanisms are apparently powerless. No specific antibodies or immune-bodies are produced by the body of its unfortunate victim. Active immunization against malignant tumors in man does not occur. In the case of the transplantation of animal tumors the only form of immunity that has been shown to exist is a natural resistance to the implanted tumor graft, which is effective only during the first few days following tumor-inoculation, but is wholly powerless against an established tumor. It apparently is the ability only of certain animal tissues to react against the tumor-graft so quickly and efficiently that the graft is overcome before it obtains a foothold in the new host. Once it begins to grow in the latter, this natural resistance or refractoriness, is no longer potent. Therefore, it seems proved beyond all doubt that an absolute immunity towards cancer-cell proliferation and progressive growth does not exist in the animal body; and that the outcome of inoculation is determined only by the natural protective forces against foreign-bodies and the proliferative vigor of the implant. This generalized refractory state is wholly distinct from other forms of active immunity; it is not passively transferable through the body fluids. Cancer-therapy must then reckon with the fact that it will receive no support or aid from the natural protective and curative powers of the body.

One of the earliest and most primitive facts established regarding the biology of cancer is that in its inception, cancer is a *localized* pathological process, and that if all of the cells of the local growth can be removed before metastasis has occurred, a cure can be accomplished. Upon this primitive foundation fact all of the theoretic and practical views concerning the nature and etiology of cancer, and

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its therapy, as well, are based, and have hardly been advanced beyond these during the last thirty years of the most intensive cancer research and study. What advance has been made in this direction has been the greater emphasis laid upon *earlier diagnosis* and *earlier and more complete operation*. In countless numbers of cases complete and lasting cure from malignant disease has been accomplished through these measures; and the percentage of cures stands in direct relationship to the diagnostic ability and the operative skill of the surgeon. Many believe that these are the only practical therapeutic criteria for cancer; and all cancer propaganda emphasizes their prime importance.

All theories and views as to the etiology and nature of cancer fall into two groups: the *exogenous* or *irritation* theory, and the *endogenous* or *biocellular* theory. Of the exogenous theories that of irritation through specific infection has during the past thirty years received the greatest degree of attention from the clinician. Numerous investigators have also expended enormous amounts of energy and labor in the effort to find a specific infective etiologic agent for cancer. Every possible variety of organism, microbic, yeast, mould, and protozoan, have at one time or another been made to contribute some species incriminated as the cause of cancer, but all to no avail. Even in those infectious diseases more or less definitely associated with the development of malignant tumors, as the Spiroptercarcinoma of the rat stomach, the cysticercus sarcoma of the rat's liver, and the Bilharzia carcinoma of man, not the slightest idea of a specific causal relation of the parasite to the associated tumor can be entertained, inasmuch as the parasites are usually dead before the development of the neoplasm, and moreover, are never found in the metastases, nor in the transplants of such tumors. In spite of the overwhelming evidence against the theory of the specific infective etiology of cancer there still arise from time to time individual workers who support it. Most of them base their belief upon the Rous chicken-sarcoma and its hypothetical filtrable virus assumed to be a living virus. This tumor, which has enjoyed a certain vogue of distinction on the ground of being at least one malignant tumor due to infection, has hindered the path of progress as far as the etiology and essential nature of neoplasm are concerned. Apparently recent workers have shown conclusively that the virus is not a living one, but a chemical substance of the nature of a growth ferment or biologic catalyst, influencing cell reproduction; and the hypothesis that the potent agent in the filtrate of the Rous sarcoma is a sub-microscopic organism has now been abandoned by most of the workers engaged in cancer research. All therapeutic attempts based upon the theory of a specific infective agent for cancer have resulted wholly in failure; vaccines, serum treatment, etc., have yielded no results either in human beings or in the case of animals.

With the abandonment of the old hypothesis of specific infection the cellular or endogenous theory has come to be more and more in the ascendant. This theory maintains that the essen-

tial nature of cancer lies in the cancer-cell itself, and that the cancer cell is a specifically changed cataplastic cell, whose individual character is to be sought wholly in specific changes of its living structure. Proof of this theory has been accumulating almost from day to day; and we have already acquired a large amount of knowledge concerning the characteristic chemical and physical properties of the cancer cell. These characteristic deviations of cancer cells from the normal show themselves in their transplantability to other individuals, their power of continued growth in cultures outside of the animal body, even in heterogenous serum, in their ability to destroy normal cells in cultures, and in their metabolism. Warburg has shown that the tumor cell has a pathological sugar metabolism, which manifests itself by a lessened oxidation, and an increased fermentation (glycolysis), especially in the presence of oxygen (aerobic glycolysis). Both methods of carbohydrate metabolism are found in all tissues, but in cancer tissue glycolysis is excessive, with the production of large quantities of lactic acid, which accumulates in a manner not found in normal tissues. This glycolytic capacity of tumor cells enables them to survive under anaerobic conditions. Brerich has repeated Warburg's work and argues with him that there is an unusual accumulation of lactic acid in cancer tissue. He, however, explains this lactic acid excess as due to the inability of the cancer cell to re-synthesize the acid to glucose, rather than to its rapid formation. Brerich regards the excess of lactic acid in cancer as a mechanism whereby cancer tissue is able to destroy the normal connective tissue about the growth and thus aid in the dissemination of the cancer. According to recent investigations of Waldschmidt-Leitz, the increased proteolysis of the cancer cell is coupled to this increased glycolysis. Cancer research at the present time has become largely biochemical and is concerned with the biology of cancer, its essential nature, cataplasia, metabolism, and heredity. The great problem is how is it that normal cells become altered to cancer cells; how does the specific cancer cell arise in the body? All agree that they do arise from body cells. In seeking a biologic answer to this question, only two biologic processes stand out as definitely related to those involved in the genesis of tumor formation, and these two are the processes of embryonal and regenerative development. For a large number of neoplasms an embryonal anlage is known with certainty to exist, as for example, in the case of malignant teratomas of the ovary and testis, the malignant neuroblastoma of the retina and sympathetic system, the neoplasms of the adrenals and kidneys in the newborn, the chordoma, angiomas, hereditary multiple chondromas, branchiogenic carcinomas, familial intestinal polyposis, and many other neoplasms, whose origin is to be referred to embryonal disturbances of development. Besides these neoplasms of undoubted embryonal origin are the tumor-formations which are *acquired* and not of embryonal origin, as x-ray cancer, paraffin cancer, arsenic carcinomas, mineral oil cancers, tar cancers, Bilharzia carcinoma, kangri cancer, and carcinomas arising in old scars, and a

whole series of neoplasms in which any local congenital anlage can be positively excluded. On the basis of both experimental investigations and many clinical observations on acquired malignant neoplasms in both man and animals, we can come only to the conclusion that these acquired neoplasms owe their origin to a repeated and frequently disturbed pathologic regeneration. Not every disturbance of the processes of regeneration leads, however, to the development of neoplasm. The recent researches on the experimental production of tar and arsenic cancer show that long-continued action of the carcinogenic substance leads to a gradually increasing disposition to the formation of a neoplastic center out of the area of regeneration. Further, it has been shown that two essential factors are necessary to tumor-formation; a general tumor-predisposition, which may be confined to one organ system; and secondly, a local tumor germinal anlage. Both of these may be embryonal or inherited, leading to the development of the typically congenital or inherited neoplasm. Both factors may also be acquired; or one may be inherited, and the other acquired. This view of the genesis of cancer is the one accepted at the present moment by some of the leaders in cancer investigation. These new hypotheses and views concerning the essential nature of cancer are reflected in an enormous number of investigations concerning the treatment of cancer. Cancer therapy, as far as its experimental study is concerned, has broken away from the old traditional line of attack, and is entering new and untrodden paths. The amount of research work that has been accomplished is so great that only the briefest analysis can be made of it here.

Particularly extensive and ingenious have been the researches aiming to produce antibodies against the cancer cell itself. As long as 25 years ago Jensen treated mouse-carcinoma with the serum of rabbits injected with the same growth, but without any influence. Borrel tried the same thing in sheep and fowls, but was also unsuccessful. Abderhalden used the expressed juice from a rat-sarcoma, and obtained a serum from rabbits and dogs which he claimed would bring about the gradual disappearance of the tumor in rats, but Fraenkel and Fűrer were unable to confirm his claims. Tyzzer, Lewin and Meidner, and Sisto, treating mice, rabbits, and guineapigs with injections of sarcoma and with saline suspensions of various organs of the normal mouse found that the serum of animals so treated was no more active than that of normal ones. Yamigiva and associates have carried out experiments on a large scale, using mouse-tumor as antigen, examining extracts of the spleen *in vivo* and *in vitro* for antibodies without result. Lumsden and Stephen obtained similar negative results without anti-sera. Bogomolets and Neiman have employed a cytotoxic serum with results that are not convincing. The body-fluids of animals that have absorbed their neoplasms have been repeatedly examined for antibodies without result. Fraenkel and Fűrer found that subcutaneous or intravenous injection of the press-juice of tumors had no curative effect upon rat-sarcoma or mouse-carcinoma. The intraperitoneal intro-

duction of mouse embryos and placenta, of embryo skin, and of spleen had no influence upon transplanted tumors. Heated tumor has been used as a therapeutic agent against rat-sarcoma by Serafin, mouse-carcinoma by Takahashi, and chicken-sarcoma by Berger, without encouraging results. Tumor autolysates have been used by Blumenthal, Hirschfeld, and Lewin, who claim moderate success, but numerous other workers have failed to duplicate their results. Glycerine extracts of various organs of heterologous species were all ineffective against mouse-carcinoma. Raising the temperatura of tumor-bearing animals, repeated chloroform anesthesia, and the use of lactic acid have all been found to have no effect upon the stock animal transplantable tumors. Human patients have been treated by Kawakami, Nakamuri, and Takei, with the serum of horses or goats inoculated with human cancer; Zerner with their own serum; Sticker with radium and cells from their own tumors; Elsner with the serum of young individuals; Fichera with autolyzed tissues, but all without any encouraging results. Tumorzidin, produced by introducing testis, ovary, or embryo, into a heterologous species has been unfavorably reported upon by Deutselmann and Kotzenberg. Okanogi found it ineffective against transplanted mouse- and rat-tumors, even when employed in larger doses relatively than those advised for the human patient. Summing up all of the work that has been carried out along this line, we must conclude that active immunization against malignant tumors in animals or man is not possible.

The attempt to find some substance that would be *lytic* for cancer cells and harmless to the living normal tissue cells has been intensively carried out in animals in various research cancer laboratories, and in man in a number of clinical centers. Almost every known chemo-therapeutic agent has been employed, but without dependable results. Colloidal lead, silver, copper, and gold have been intensively tried out, particularly in the case of lead by Bell and Todd. In general, biologists and biochemists have failed to find any specific action upon cancer cells by the compounds used; and we may sum up this phase of cancer-therapy by saying that a scientific basis for this mode of treatment of cancer is not established. The same thing is true of the application to cancer-therapy of injections of intravital dyes; about 150 various dyes having been tried out by different workers up to the present time without any promising results. The claims of Munck in Copenhagen of the favorable action of trypan blue on transplanted tumors in mice could not be confirmed by other workers. Similarly the work of Bernhardt and Strauch with intravenous injections of isamin blue on cases of human cancer could not be confirmed by Fichera in Milan. Thirty-two inorganic salts were tried out by Sugiura and Benedict; potassium, magnesium, sodium, and calcium by Sano and Mizutani; magnesium chloride by Itami; allyl derivatives by Koenigsfeld and Prauchnitz; iodine, arsenic, antimony, sodium fluoride, naphthalin, selenium, and tellurium by Uhlenhuth; indol products by Centanni; metals and tartrates by Ishinari; nucleic acid and various pro-

tein preparations by Lewin; vitamines by Fraenkel and Fűrer, and many other investigators; insulin by Kato and Cioffari; extract of adrenal cortex by Coffey and Humber; and many other substances, all of which yield results not acceptable to conservative criticism. Recently mustard gas (dichlor-ethyl-sulphide) is being exploited by certain English workers as an anticarcinogenic substance. What practical application to human cancer can be made of this does not seem apparent.

Irradiation with x-rays and with radium have enjoyed a marked vogue of popularity in the treatment of human cancer. The most experienced workers, as Regaud in Paris, Fichera in Milan, Blumenthal in Berlin, and Forsell in Stockholm, with others in Europe and in America are agreed that as a primary form of therapy, radium is successful only in cancer of epidermal origin (skin of face, tongue, and female genitalia), and has certain advantages over surgical operation. In other lesions, its use is purely palliative. Combined with surgery the use of radium has a definite but limited sphere of usefulness. Improvements in the technique of radium treatment will undoubtedly extend this.

The newest field of cancer-therapy investigation is based upon the effort to influence the metabolism of the cancer cell. Warburg has carried out a series of experiments on mice with the aim of starving out the cancer cells by interference with their sugar and oxygen supply. In an attempt to interrupt the respiration of the cancer cells the animals were made to breathe an atmosphere containing only 5 per cent of oxygen over a period of several hours. Apparently because of the over-crowding of the cancer-cells and through injury to the cells of the thin-walled blood-vessels of the neoplasm, the tumors were less resistant to oxygen lack than the normal tissues, and biopsies showed that practically all of the cancer cells had died or ceased to function. Attempts to interfere with the sugar supply of the tumors by maintaining the animals in insulin shock did not appear to influence the survival of the tumors. Sokoloff of Prague, has reported experiments in which the cancer cells were injured by an opposite metabolic effect, too rapid breathing, induced by the injection of a compound containing an extract of the adrenal cortex. Other experiments with insulin, vitamins, and metabolic products have up to the present time been fruitless. Jacobson attempted the suffocation of tumors by means of yeast, which split up the glycogen in and about the growth into carbon dioxide and water, but no controls were mentioned and the number of animals employed was too small to admit of any conclusion as to the value of this treatment.

Fischer-Wasels, of the Senckenberg Pathological Institute in Frankfurt, has contributed the latest new method of cancer-therapy on the theory of influencing the general metabolism of the body and that of the cancer-cells themselves, based upon Warburg's theory of the pathological respiration and glycolysis of the tumor cell, and upon the alkalosis of the blood observed in cancer-patients by Reding and others; and upon his own views of the excess of lactic acid in the tu-

mor. Based upon the results of animal experiments, Fischer-Wasels has employed the following treatment of cancer in human beings for 1½ years:

A. Local Treatment. Intensive deep x-ray therapy of the primary tumor, and when necessary, of the metastases, according to the method of Holfelder.

B. General Treatment. 1. Daily 2-4 hours breathing of a mixture of pure oxygen and 5 per cent carbonic acid, with tightly fitting mask to avoid apparent respiration.

2. Three times daily, after meal times, HCl per os in largest possible doses (Control of the PH of the urine).

3. Activation of the reticulo-endothelial system by ultraviolet irradiation (Alpine sun) of the entire body. The dose to be regulated according to the individual, and to prevent over-loading of the reticulo-endothelial system, the untraviolet irradiation should not be carried out on the same day as the x-ray irradiation.

The number of human cases so far treated by this method is small, largely due to the cost of the gas-mixture, since the treatment must be carried through many months without interruption. Good results are claimed for this treatment in a number of cases of carcinoma of the esophagus, inoperable carcinoma of the stomach, and in a case of carcinoma of the mamma with generalized metastases. Less striking results were obtained in cases of cancer of the cervix, uterus, and intestine. The breathing of the gas-mixture was carried out without difficulty and, although continued in some cases for many months, no harmful effects were observed from it. The treatment appeared to produce good effects on sleep, appetite, blood-condition, and weight. After each treatment a local painful reaction was observed in all external malignant tumors and bone tumors; and in single cases, also in carcinoma of the uterus and intestine, which were repeated after each gas-breathing. The general condition improved, the blood picture became better, the weight increased, and the cancer cachexia was brought to a standstill for months.

The results claimed for a series of cases treated by this combination of deep x-ray therapy and gas-acid treatment are striking, but the number of cases is too small to permit any definite conclusions to be drawn. In the meantime experimental treatment of human cases by this method will continue, and the results will be published later. It is encouraging that this new biologic method of treatment, which is developed upon the basis of known facts as to the nature and biology of cancer, is not heralded as a new cure for cancer, but the theory and method are plained in a conservative and scientific manner and no claims are made. Further, it is the first method of cancer therapy to be based on the modern biologic and constitutional conception of the etiology and nature of cancer. Whether these theories and their therapeutic applications are right remains to be seen. It will take the experience of years before any positive judgment as to the curative value of any form of cancer treatment can be made. The consensus of opinion as to the criterion of cancer cure in the adoption of a

five-year period without recurrence is altogether inadequate, in the opinion of the writer, who has repeatedly seen recurrence after seven, ten, and twelve years. In a case of scirrhous carcinoma diagnosed by him in 1914, the patient was still alive in 1927 with generalized metastases in the lungs. While such cases are not the rule, yet the possibility of delayed recurrence and metastases constitutes a factor of importance in the evaluation of any supposedly curative method of treatment of human cancer.

Abstracts

Further Experiments Concerning Immunologic Reciprocity Between Yaws and Syphilis. By OTTO SCHÖBL. (The Philippine Journal of Science, October, 1930. p. 263).

Additional experimental evidence showing that yaws infection immunizes Philippine monkeys against cutaneous inoculation with syphilis is given in this paper. Eleven Philippine monkeys that had gone through yaws infection and were proven to be immune to yaws were inoculated with syphilis by intradermal injection on the scrotum. Two normal control animals were included in the test for immunity to syphilis. The shortest interval of time between the first inoculation with yaws and the test for immunity to syphilis was twelve months, the longest twenty-one months. Following the inoculation with syphilis the places of inoculation were inspected regularly for a period of five months. At various intervals of time the inguinal lymphnodes corresponding to the point of inoculation with syphilis on the scrotum were removed aseptically and transplanted to the testicles of normal rabbits. These rabbits were inspected weekly for a period of five months and the results were noted. None of the yaws immune-monkeys developed lesions at the places of inoculations with syphilis, and none of them harbored viable spirochetes in the lymph glands corresponding to the places of inoculation with syphilis. All normal control monkeys developed typical syphilitic lesions and harbored viable spirochetes in the lymphnodes corresponding to the places of inoculation with syphilis. The conclusion drawn from previous experiments that immunity to yaws gained by yaws infection protects Philippine monkeys aganst cutaneous inoculation with syphilis is hereby confirmed.

Psittacosis: Epidemiological Considerations with Reference to the 1929-30 Outbreak in the United States. By CHARLES ARMSTRONG (Public Health Report, August 29, 1930).

Psittacosis of man has been reported for the United States by Vickery and Richardson, 1904; Scott, 1906; McClintock, 1925; and Sailer, 1927. The 1929-30 outbreak is, however, the most extensive yet reported for this country. Nevertheless, it seems certain that this outbreak would largely have escaped detection as to its real nature had not the press brought the condition and its striking association with parrots before the public and the medical profession. It is, therefore, impossible to determine to what extent the recent outbreak is exceptional; but if we are correct in concluding that the disease is endemic among tropical birds, and considering the frequency with which psittacosis has been reported in other countries, it seems probable that sporadic cases have occurred more frequently in the United States than has heretofore been realized. There are now on record [illegible] of infection which gave rise to 169 cases, with 33 deaths, from November 23, 1929, to May 7, 1930. These cases occurred in 15 states and the District of Columbia, and do not include 16 laboratory infections with two deaths, nor 12 probable cases which were removed from two merchant ships entering our ports, following exposure aboard ship to parrots purchased in Germany and Brazil. The mortality in the reported cases was 19 per cent. It is possible, however, that other deaths occurred in this series, since many of our reports were secured prior to the termination of the illness. Age is an important factor in determining the outcome, children and young folks tending to have light attacks. There

was not a death reported among 35 patients under 30 years of age, while approximately 24 per cent of patients over the age died. Death is probably due to the pneumonic involvement in most cases, and occurs usually from the 7-15th day of illness; later deaths, however, occasionally occur and may be due to embolism from a complicating venous thrombus; at least two deaths attributed to this cause occurred among the above-mentioned fatal cases. Theoretically, the control of psittacosis in man is simple and consists in the avoidance of contact with tropical birds. Practically, however, it may be difficult permanently to prevent traffic in birds which are favored as pets by a considerable group of our population. Methods aimed toward rendering the traffic harmless rather than toward preventing it are therefore desirable. Strictly scientific information is, however, not yet available for the guidance of such a plan.

Die Insulinlipodystrophie bei Kindern. By Richard Priesel and Richard Wagner (Klin. Wschr., Aug. 16, 1930, p. 1548).

Two years ago the authors noted a local disappearance of fat in insulin-treated children. They came to the conclusion that it was very probable that the local lipodystrophy was due to the trikresol added to the insulin for purposes of preservation of the latter. Depisch (Wien. Med. Wschr. 80, 168, 1930) made observations also on this local lipodystrophy and came to the following conclusions: In about 10 per cent of insulin-treated patients there develops, after 2 months to 2 years, a disappearance of adipose tissue in those skin areas in which the injections have been given. This lipodystrophy is more frequent in the female sex than in the male. It is dependent upon the traumatic-chemical local reaction. Depisch regarded it as probable that the disappearance of the fat was directly dependent upon the use of the insulin and of neurotrophic origin. To avoid its occurrence he recommends the frequent changing of the injection area. Inasmuch as he was unable to produce the condition by the injection of trikresol in a patient for a period of two months, he decided that the insulin itself was the cause of the disappearance of the fat. Priesel and Wagner, on the other hand, believe that the local lipodystrophy resulting from insulin injections is the result of a severe grade of trikresol injury. Mild degrees of lipodystrophy are found in a large per cent of diabetic children, severe forms are rare. They saw two cases only in 109 diabetic children and both of these were boys. In one of these during a period of fat increase in the body the injected area remained free from fat deposit, so that the condition was not one of local fat disappearance but rather one of a lipophobia. Priesel and Wagner recommend the frequent changing of the area of injections in diabetic children, and the use of concentrated insulin. If the tissue-damage was due to the insulin the use of concentrated insulin would be contra-indicated; but its use in one patient in whom lipodystrophy had already occurred, produced no new areas of loss of fat; hence, the author's believe their theory of trikresol damage to be correct.

Liver and Copper. By N. Andrianoff and S. Ansbacher (Deut. med. Wschr., 1930, p. 357).

The copper content of the normal liver varies between 0.5 and 13 mg. pro Kilo liver. Out of 21 cirrhotic livers only 3 had a copper content under 20 mg; the others had a much higher value, even over 100 mg. Experiments on rats would tend to show that the copper has an etiologic rôle in the production of cirrhosis, and that the increased copper content is not the result of the cirrhosis. Feeding of rats with inorganic copper salts led to the production of a cirrhosis of the liver in three out of 4 cases. The increased copper content of the nursling's liver has no relation to that in hepatic cirrhosis. This finding, demonstrated by Lubarsch in the case of man, was confirmed in the case of animals by these observers.

Ueber Bang—Infektionem in Kindesalter. By A. Hottinger (Klin. Wschr., Sept. 13, 1930).

The clinical picture of Bang-infections is so little known that it is important to collect and to publish observations on this in-

teresting disease. Whether diseases due to infection with the Bang bacillus are common or rare is a question not yet settled. One has the impression that few cases have been correctly diagnosed because the disease picture is very similar to that of other diseases, and the diagnosis cannot be made through clinical data but by means of bacteriological findings. Bang infections have been described only a few times in children. Fleischmann and Raddatz reported a case of the disease in a child of 10 years; and Kling one in an 8 year old. In the American literature there are reports on five cases occurring in the first decennium. One of these was 22 months old, another was only 15 months. Hottinger reports two cases observed by him, which are of interest not only because of their age, but also clinically and from the standpoint of epidemiology. Diagnosis was made serologically. One was an abortive case in a 4 1-2 year old boy with moderate fever, roseolar eruption, and spontaneous healing in a few weeks. The other case was that of a 9 year old girl with a severe, protracted, high fever, with the clinical picture of infective jaundice, and showing a lowered constitutional value following whooping cough. This child had been nourished without milk. The first child also had had no raw milk. The epidemiology of both cases is therefore of the greatest interest. Other milk products, however, may have been responsible for the infection. Butter and cheese had been a part of the diet in both cases. Since raw milk as the source of the Bang infection in these two cases can be wholly excluded, suspicion is thrown upon other milk-products, butter especially, as conveying the infection. Both patients came from the same quarter of the city in which an adult with a severe Bang infection lived; and in the same street in which patient No. 1 lived, dwelt also the milk-dealer who delivered milk to the house of patient No. 2 in Solingen. For over a year an epidemic of febrile icterus had prevailed in Solingen. Whether this was due to a Bang infection is not definitely proved, but the coincidence was suspicious. No positive information could be obtained further that would throw light upon the epidemiology. The diagnosis in both cases rested upon the serological findings—a positive aggultination in a dilution of 1:200. In case No. 1 the agglutinating power of the serum became negative after recovery. These two cases show that Bang infections, like other septic processes, may show the greatest differences in the clinical picture.

Syphilis and Malignant Disease. A Serological Study. By H. J. B. Fry (The Jour. of Hygiene, XXIX, 1930).

There exists some doubt as to the exact importance to be attributed to syphilis in the etiology of malignant disease. Esmarch (1889) believed that malignant disease was referable to a predisposition inherited from syphilitic forebears. Syphilis has also been regarded by French writers as of great importance in the production of cancer, who have termed it "le lit du cancer". Others regard the relationship as less definite. Foerster found only 4 positive Wassermanns in 35 cases of cancer; Caan had positive results in 41 per cent of 85 cases of carcinoma; Fox found 5 positive reactions in 207 cases of cancer. McCormac and Mason in 137 cases of cancer found 10.2 per cent positive Wassermanns. Fry took 1000 unselected cases of malignant disease receiving treatment in the Cancer Hospital, London, and compared the figures of the Wassermann reactions obtained with a control series of patients similarly attending the hospital but found to be suffering with diseases other than malignant. The same method and the same alcoholic extract were used throughout. Harrison's technique was used. No serum was regarded as giving a weak positive unless there was complete (+) or at least partial inhibition of hemolysis in the tube containing 3 M.H.D. of complement. In the latter case the sera were examined on a subsequent occasion or a fresh sample taken. The conclusions arrived at may be summarized, as follows: There is a lower percentage of positive Wassermanns in cases of malignant disease than in a similar population of non-malignant cases. If buccal cancers are excluded, the percentage is half that in non-malig-

nant cases. Cancer of the tongue and buccal cavity, in which a high percentage of positive Wassermanns is found, is almost confined to males and is probably due less to syphilitic infection than to some other factor such as smoking. There is a low percentage of syphilis in cancer of the digestive tract, except in cases of cancer of the stomach, and the incidence diminishes from mouth to anus. Syphilis does not appear to be a factor of importance in cancer of the glandular organs, nor, apart from the lip, in the production of cutaneous cancer. In general, from the above figures there is no evidence that syphilis plays any direct or very important part in the production of cancer. In the 1000 cases of malignant disease there were 97 positive Wassermanns or 9.7 per cent. In 868 controls there were 115 positive reactions or 13.2 per cent.

Probable Cause of Jamaica Ginger Paralysis. (United States Public Health Service, August 20, 1930.)

A peculiar form of paralysis, perhaps unlike anything ever known before, has recently afflicted a relatively large proportion of the population throughout some of the Midwestern and Southwestern States. Definite figures on the extent of the disease are not available, but it is certain that the numbers run into the thousands. At the request of the State Health authorities of several States, the United States Public Health Service undertook studies of this condition. The investigations made in some of the stricken areas in Ohio and Tennessee seem to confirm the widespread rumor that the disease is closely associated with the drinking of an adulterated fluid extract of ginger. That it could not be due to the ginger as such became clearly evident from the fact that many of the victims when questioned admitted freely of having used similar preparations for beverage purposes for from 1 to 5 years with no other affects than those derived from the alcohol. It soon became evident, therefore, that the condition must have resulted from some unknown poison or from some known poison whose action was so altered through the ginger or the alcohol as to render it unrecognizable; which poison in some way got into a manufactured lot of so-called fluid extract of ginger at a relatively recent date.

The possibility of some known or only partially known poison with its properties so altered as to produce a condition in man heretofore virtually unknown, must be considered. From the very nature of the problem it would seem not improbable that the suspected ginger contained some denaturant, since denatured alcohol might very well have been, and probably was, used in the manufacture of some of the ginger extract, or that it contained some adulterant, since it is known with certainty that adulterants of various kinds have been used for some years in the manufacture of this preparation. The studies conducted by the Public Health Service, though by no means complete, seem to indicate that the latter explanation appears to be the correct one, though the mechanism of the suspected adulterant is as yet not clear.

The exact nature of the pharmacology of the compound which has been found uniformly present in suspected ginger and absent in unsuspected ginger is as yet unknown. From its chemical behavior it appears to resemble a phosphoric acid ester of Trikresol, which in itself does not appear to be a well-defined chemical entity. Its resistance to heat, the strong alkali and extreme heat required for its saponification, and the fact that phosphate has been found in the suspected gingers, would make it very probable that it may indeed be the ester suggested.

Further studies of the subject are being continued by the Public Health Service.

Reviews

The Long Trek. Around the World with Camera and Rifle. The Story of an African Asiatic Expedition, 1929-1930. By RICHARD L. SUTTON, M.D., Sc.D., LL.D., F.R.S. (Edin.), Professor of Dermatology, University of Kansas; and RICHARD L. SUTTON, JR., A.M., B.Sc., M.D. With more than 200 illustrations, 347 pages. The C. V. Mosby Company, St. Louis, Missouri, 1930. Price in cloth, $5.00.

Those who had the pleasure of reading "An African Holiday" and "Tiger Trails in Southern Asia," Dr. Sutton's other travel books, will welcome the present volume with its interesting story of his third hunting trip in East Africa, Sumatra, and Indo-China. This expedition was undertaken in fulfillment of a promise made many years ago to his son, on completion of his medical course; and two of the chapters and more than half of the photographs are contributed by the latter. Their trip proper began at Tanga, thence to Moshi and Arusha, where their hunting actually began. The story of their kills is much less interesting than the tale of their wanderings, with their many observations on the scenery, customs and manners of the natives; and above all the many interesting photographs taken. These in themselves are the best part of the book and give one a better idea of what Africa is really like than pages of description could accomplish. Both of the Suttons are experienced photographers and have an instinct for the picture that is interesting. On these trips thousands of photos and many thousand feet of movie film were taken, and nearly five hundred illustrations were taken from the best of these for use in the three books. From Africa our hunters went to Indo-China in pursuit of tigers, and here fortune was more propitious than it had been in the case of elephants and lions in Africa. In the case of lions, leopards, and tigers, the Suttons proved conclusively that catnip oil did not attract the animals, but actually frightened them away. The Asiatic elephant proved as wary as the African: the younger Sutton chased a herd for five weeks without getting a shot. On the whole there is less of hunting in this volume than in the other two; but this does not make it any the less interesting as a tale of travel in strange lands. This tale is told with a refreshing vivacity and conciseness, and in a most graphic manner.

The Candirú. The Only Vertebrate Parasite of Man. By EUGENE WILLIS GUDGER, Ph.D., Bibliographer and Associate in Ichthyology, American Museum of Natural History, New York City. With a Foreword by ALDRED SCOTT WARTHIN, Ph.D., M.D., LL.D., Professor of Pathology and Director of the Pathological Laboratories in the University of Michigan, Ann Arbor. 120 pages, 18 illustrations. Paul B. Hoeber, Inc., New York, 1930. Price in cloth, $1.50.

For more than a hundred years travellers in the Amazon valley have brought back tales of a fish that has the unpleasant habit of entering the urethra of men and women bathers, particularly if they should pass urine in the water. By erecting spines on its gill covers the fish could so firmly establish itself, that only a serious surgical operation could effect its removal. So widespread among the natives was a belief in this story, that in various Amazonian waters, bathing is not resorted to without the precautionary protection of the genitals by different contrivances, such as cocoanut shells or sheaths made of palm leaves. The late Professor Eigenmann was fully convinced of the truth of these stories, and created the new genus *Urinophilus* to include the fish showing this peculiar habit. The name Candirú is a collective name given to the small catfishes of the Amazon and its tributaries belonging to

this interesting genus. Gudger's object in writing about the Candiru was to collect all of the material bearing upon this alleged human parasitism of the Candirú and to present it in definite form with the view of subjecting these accounts to a rigid scientific scrutiny to determine whether or not these tales are credible. This was a task of five years. There is set forth in his book a great mass of testimony bearing on the subject from 1829 to 1929, and this testimony backed by the names of the testifiers is impressive and conclusive. To the material afforded by the literature has been added the experience and testimony of scientific and medical men in Brazil. From the ichthyologist's point of view the evidence has been arranged and analyzed in order beginning with the simplest habits of the fishes and moving steadily up to the matter of parasitism and urinophilism. All of this is told in a vivacious and interesting manner that makes this fish story very good reading indeed. As a biologic phenomenon the acquisition of urethral parasitism by these minute fish possesses the greatest interest as one of the minor evolutionary processes admitting of scientific interpretation. Gudger concludes his interesting story with the statement that the evidence offered is sufficient to convince a jury in a court of law, and that he cannot withhold his belief in it.

Clinical Examination of the Nervous System. By G. H. Monrad-Kohn, M.D., F.R.C.P., Professor of Medicine in the Royal Frederick University, Oslo; Physician-in-Chief to the University Clinic for Nervous Diseases, Oslo. With a Foreword by T. Grainger Stewart, M.D., F.R.C.P., Physician to the National Hospital for the Paralyzed and Epileptic, Queen Square; Neurologist to the West London Hospital. Fifth Edition. 222 pages, 57 illustrations. Paul B. Hoeber, Inc., New York, 1930. Price in cloth, $2.50.

The issue of five editions, in addition to a revised French edition, since 1921, speaks well for the reception accorded this clinical manual of routine methods of examination of the nervous system. For the present edition the author has again revised the book, and has made a number of minor additions and alterations. A short description of the methods of ventriculography and encephalography has been added. In the chapter on repeated examinations the author has also added a description of the uses of hypertonic solutions as a means of reducing intracranial testion and thereby rendering a dazed patient cooperative for a subsequent examination. As in the case of the other editions the present one is not a translation, but was written in English by Dr. Monrad-Kohn himself. The book is therefore free from that vagueness of meaning common to many translations. It is to be recommended to all who are especially interested in disorders of the nervous system, as well as to those engaged in general practice.

Minor Surgery and Bandaging. For the Use of House Surgeons, Dressers, and Junior Practitioners. By Gwynne Williams, M.S., F.R.C.P., Surgeon, University College Hospital. Twentieth Edition. 445 pages, 262 illustrations. F. A. Davis Company, Philadelphia, 1930. Price in flexible covers, $3.50.

The changes which have been made in the twentieth edition are scattered throughout the book. They are all those which have been practically tested, and which have passed into the ordinary routine of house surgeons, as for example, the injection treatment of varicose veins. The chapters on fractures have been extended, and the non-operative treatment of the common varieties has been detailed more fully with the aid of illustrative diagrams. The chapter on anesthetics has been revised by Drs. Dudley Buxton and H. N. Webber. The material is treated in the following chapters: The Examination of the Patient; Asepsis; Preparation of the Patient for Operation—The Operation; Post-Operative Treatment; Wounds, Contusions, Burns, Accidents, Foreign Bodies, Etc.; Hemorrhage; Genito-urinary Diseases; Acute Abdominal Conditions, Hernia, etc.; Minor Operations; Irrigation - Ointments - Fomentations - Poultices-Strapping; Bandages; Fractures; Special Fractures; Dislocations; Orthopedic Appliances; The Administration of Anesthetics—Local, Regional, and Spinal Anal-

gesia. The material is thorough and excellent; it is well organized. It will be of great service to internes and house-surgeons as a convenient, handy book of minor surgery.

The Action of Muscles. Including Muscle Rest and Muscle Re-Education. By Sir COLIN MACKENZIE, M.D., F.R.C.S., F.R.S. (Edin.); Professor of Comparative Anatomy, and Director of the Australian Institute of Anatomy, Canberra. Second edition, 288 pages, 100 illustrations. Paul B. Hoeber, Inc., New York, 1930. Price in cloth, $3.50.

With the rapid development of physical therapy in this country, an increasing amount of attention is being paid to the importance of muscle function; and a department of myology or muscle re-education is now instituted in the majority of modern hospitals. The after-experience of the great war showed that 65 per cent of the wounded men returning from the battlefields were suffering from disabilities of an orthopedic nature of such a character that the question of muscular function became of prime importance for purposes of treatment. Muscular tissue alone constitutes the greater part of most animals; and more attention should be paid to the teaching of muscle function. This cannot be taught satisfactorily in the dissecting room, but should be demonstrated upon the living body, through comparison of the normal with the paralytic. Only on this plan can the question of the origin and insertion of a muscle have more than an academic interest for the student. Just as important as the knowledge of the action of a muscle is the knowledge of its opponent, and the opponent should be specifically mentioned. The fact that the student when learning the action of a muscle learns that of the opponent will have an important influence on his treatment, for example, of muscular weakness, or paralysis, or of joint injuries. In the case of weakness of any given muscle he will recognize that there can be no recovery if the opposing muscle be allowed to contract, and will immediately guard against such an occurrence. The author believes also that some appreciation of the comparative anatomy of the muscle is essential for the clinician. He emphasizes the important fact, unfortunately lost sight of by the ordinary clinician, that the one true test of muscle function is the volitional test scientifically applied. As far as methods of treatment are concerned, the principle cannot be repeated too often that an ounce of scientifically directed volitional effort is worth pounds of passive treatment in the form of massage or electrical treatment. This book will be of the greatest value to all interested in orthopedics and physical therapy, and a thorough knowledge of myology is essential to the orthopedic surgeon. Many of the general principles herein outlined are important to the general practitioner as well. The book is well illustrated with practical illustrations.

Clinical Features of Heart Disease. An Interpretation of the Mechanics of Diagnosis for Practitioners. By LEROY CRUMMER, M.D., Emeritus Professor of Medicine, University of Nebraska. Introduction by Emannuel Libman, M.D., Professor of Clinical Medicine, Columbia University. Second Edition, Revised and Enlarged. 415 pages. Paul B. Hoeber, Inc., New York, 1930. Price in cloth, $4.00.

In presenting this second edition there has been no change in viewpoint. Practically every chapter contains some added material. Chapters on acute Rheumatic Fever and Subacute Bacterial Endocarditis have been added. Heart disease is usually progressive. Usually many years elapse between the beginning and end of most cardiac affections, and during this long period much can be done to direct the course of the disease by the well-trained physician. The natural history of heart conditions can be followed more accurately in private than in hospital practice. But a proper foundation is necessary for the recognition and interpretation of clinical phenomena; and this foundation must be a broad one, embracing not only the older methods of physical examination, but also the newer mechanical aids in diagnosis. This volume emphasizes the importance of the simple methods of physical examination, and for this reason, is especially timely as showing that the study of clinical phenomena is as important and nec-

essary now in the training of the physician as it ever was. The volume contains much of value in original observations and suggestions. It is a book of value to the medical student and practitioner alike.

Nervous Indigestion. By WALTER C. ALVAREZ, M.D., Associate Professor of Medicine, University of Minnesota (Mayo Foundation). 297 pages. Paul B. Hoeber, Inc., 1930. Price in cloth, $3.75.

This is a very common-sense treatment of the subject of functional or so-called "nervous indigestion." More than half of the patients who go to a physician for advice in regard to chronic indigestion have symptoms apparently largely 'functional" in nature. No organic lesions can be demonstrated in them, and no definite anatomic diagnosis can be made. Because of the difficulty in making a diagnosis, these patients are for the greater part neglected. What clinician and what practitioner concerns himself with the effect of emotion upon the digestive tract? Neither the internist, the neurologist, nor the psychiatrist! Teachers of medicine are interested in the demonstrable lesion, and not in cases in which lesions cannot be found and in which a definite diagnosis cannot be made. Consequently the student is not prepared for the actualities of medical practice, particularly with the problems and difficulties involved in the treatment of the so-called "nervous" patient. That this field is a neglected one in the medical schools is evident to anyone who attends the lectures or clinics, or makes ward rounds. As a consequence it is a far cry from the medical practice of our teaching clinics to the private practice of a down-town office. In the latter place the young practitioner will learn that in the actual practice of medicine there are many things more important than the giving of drugs or the exploratory operation. The seven chapters in this book are headed: Ways in Which Emotion Can Affect the Digestive Tract; Types of Indigestion; Hints in Regard to the Taking of a History; The Handling of the Nervous Patient; The Treatment of Nervous Indigestion; Some Practical Points About the Physiology and Innervation of the Digestive Tract; and Suggestions for Further Reading. Bibliography and Index follow. The material is presented in a semi-popular style, suitable for reading by the laity, for whom it is apparently intended as much as for the practitioner. And it is worth their perusal. In Chapter Two on Types of Indigestion many grains of pure gold are to be found. This chapter should be read by all those who have "indigestion," and who have an interest in "diets" or "dieting." How certain Sanitarium authorities must gnash their teeth when they read it! The reviewer, as a pathologist, finds himself strangely in agreement with a gastro-enterologist for the first time. This book is important because of the truths it tells. The style is vivacious. The chapters are interleaved with pages of fact and interesting quotations from a great variety of sources. They add a literary flavor to the exposition of sound sense contained in this book.

College News Notes

FIFTEENTH ANNUAL CLINICAL SESSION of the AMERICAN COLLEGE OF PHYSICIANS at BALTIMORE MARCH 23-27, 1931

Dr. Sydney R. Miller, President, and Dr. Maurice C. Pincoffs, General Chairman, will shortly announce the preliminary program for the Fifteenth Annual Clinical Session of the American College of Physicians at Baltimore, Maryland, March 23-27, 1931. Mr. E. R. Loveland, Executive Secretary, has completed the plans for the exhibits, hotel headquarters, general headquarters for the daily sessions, transportation on the reduced fare plan and many other details.

The Lord Baltimore Hotel, the newest and largest in Baltimore, will be the hotel headquarters. Due to inadequate sized meeting rooms at any hotel, the President, General Chairman and Executive Secretary selected the Alcazar at Cathedral and Madison Streets, for the general headquarters. The Alcazar is operated more or less as a club hotel, but has the largest and most attractive assembly room in the City of Baltimore. Here will be held the registration, the general scientific sessions, the exhibits, etc. The headquarters and offices of the Officers, Regents and members of the Board of Governors will also be located here. The Alcazar operates an attractive dining room where members will be able to secure meals before and after the daily sessions. The Alcazar also has available a few hundred rooms for members of the College who do not desire to take rooms at the Lord Baltimore Hotel.

The time of the Session, March 23-27, and the favorable climate of Baltimore, should induce a much larger attendance than the mid-winter session held during the past year. There will be a large class of new Fellows and Associates to be taken into the College. It is most important that proposals for membership be filed in the Executive Secretary's office fully a month in advance of the Session.

Members of the College should consider it an obligation to attend the Clinical Sessions, whenever possible. Especially, the attendance and contributions of those so fortunately placed that their opportunities are exceptional means much to the rank and file of physicians who come to these meetings. These annual sessions, held at important medical centers, should always attract large numbers of members, for they furnish an unique opportunity to those who participate in the programs to present the results of their work before an audience competent to appreciate the value of their contributions. As usual, the Baltimore Session will be given to half day clinics, consisting of hospital visits, demonstrations and clinics by the local profession, as well as invited guests; half day general sessions consisting of reports or addresses on medical work by members of the College from other localities; and evening sessions consisting of formal addresses by distinguished guests, American or foreign, and by the President and other representatives of the College. The general sessions, giving an opportunity to members of the College, wherever they may be located, to present the results of their work to a large assembly of men interested in Clinical Medicine, is probably the most important function of the College. There is no substitute for attendance at these important national meetings, for one benefits most through personal contacts and actual presence.

Physicians not already on the mailing list of the College, may receive the program for the Session by application to the Executive Secretary, Mr. E. R. Loveland, 133-135 South 36th Street, Philadelphia, Pa.

PROMINENT MEMBERS HONORED by UNIVERSITY OF PENNSYLVANIA

On October 10 and 11, the University of Pennsylvania conducted a celebration of medical progress at that institution from its founding to the present time.

Dr. Alfred Stengel (Master), Ex-President of the American College of Physicians, Professor of Medicine at the University of Pennsylvania School of Medicine and a member of the Board of Trustees of the University of Pennsylvania, was honored with the degree of Doctor of Laws.

Dr. William Gerry Morgan (Fellow), President of the American Medical Association and an alumnus of the University of Pennsylvania School of Medicine, was honored with the degree also of Doctor of Laws.

Surgeon-General Hugh S. Cumming (Fellow) of the U. S. Public Health Service, President of the American Public Health Association, was honored with the degree of Doctor of Science.

Among others honored by degrees were:

Sir Walter Morley Fletcher, Secretary of the Research Council of Great Britain.

Prof. A. V. Hill, Institute of Physiology, University College, London.

Prof. William H. Welch of Johns Hopkins University School of Medicine.

Dr. J. Ramsay Hunt, Clinical Professor of Neurology, Columbia University.

Dr. Alonzo Engelbert Taylor, a Director of the Food Research Institute of Leland Stanford University.

The Convocation for the conferring of the special degrees was held on October 10, followed by a luncheon, an afternoon session and an evening dinner. Dr. O. H. Perry Pepper (Fellow) and Dr. William Gerry Morgan (Fellow) were among the dinner speakers.

On the Committee of Arrangements appeared the names of the following Fellows of the College:

Dr. O. H. Perry Pepper, Vice-Chairman
Dr. George Morris Piersol
Dr. Alfred Stengel
Dr. T. Grier Miller

There were clinical presentations, exhibits and demonstrations held at the University Hospital, the Medical Laboratories, the Henry Phipps Institute, the Graduate Hospital, and at other University institutions. Dr. Stengel and Dr. Pepper gave a medical clinic; Dr. T. Grier Miller gave a gastro-intestinal clinic; Dr. Russell Richardson (Fellow) gave a clinic on diabetes; Dr. E. B. Krumbhaar (Fellow) gave a demonstration in the Laboratory of Pathology; Dr. H. R. M. Landis (Fellow) presented exhibits and demonstrations at the Henry Phipps Institute.

Dr. O. A. Fiedler (Fellow), Cardiologist at the Sheboygan Clinic, was chosen President-Elect of the Wisconsin State Medical Society at its recent anniversary meeting in Milwaukee.

Acknowledgement is made of the following gifts of publications to the College Library of publications by members:

Dr. Aaron E. Parsonnet (Fellow), Newark, N. J., and Dr. Albert S. Hyman (Fellow), New York, N. Y.:

3 Reprints—"Barium Chlorid in the Stokes-Adams Syndrome of Complete Heart Block"
"Bundle Branch Block"
"Myocardosis"

Dr. E. R. Stitt (Fellow), Rear Admiral, U. S. Navy, is now stationed at the U. S. Naval Hospital, San Diego, Calif. Dr. Stitt was formerly Surgeon-General of the Medical Corps of the U. S. Navy.

At the recent British Medical Association's meeting in Winnipeg the following Fellows of the American College of Physicians participated in the program:

Dr. William Gerry Morgan, Washington, D. C.
Dr. Francis M. Pottenger, Monrovia, Calif.
Dr. A. W. White, Oklahoma City, Okla.
Dr. Lea A. Riely, Oklahoma City, Okla.

Dr. John I. Marker (Fellow), Davenport, Ia., addressed the Jackson County (Iowa)

Medical Society on Insurance Examinations, September 17.

Dr. L. T. LeWald (Fellow), Professor of Roentgenology, New York University, read a paper entitled "Pulmonary Tuberculosis: Errors in Differential Diagnosis," at the annual meeting of the American Roentgen Ray Society at West Baden, Ind., September 24, 1930.

Among biographies with full page portraits appearing in the last edition of the National Cyclopedia of American Biography, appears that of Dr. Lorena B. Breed (Fellow), Pasadena, Calif.

Dr. Ralph Pemberton (Fellow), Philadelphia, addressed the Northwest Ohio Medical Society on arthritis at Toledo on October 7, 1930.

Dr. Ellen C. Potter (Fellow), Director of Medicine of the Department of Institutions and Agencies of New Jersey, has been elected a member of the Executive Committee of the National Conference of Social Work; headquarters, Columbus, Ohio.

Dr. Jacob Gutman (Fellow), Brooklyn, has recently returned from St. Louis, where he delivered an address on "Physical Therapy in Cardiac Disease" before the medical section of the American Congress of Physical Therapy.

Dr. Douglas Brown (Fellow) has been officially transferred from the U. S. Veterans Hospital at Washington, D. C., to the U. S. Veterans Hospital at Rutland Heights, Mass.

Dr. Samuel S. Riven (Associate) has transferred from the Department of Internal Medicine of the University of Michigan to Vanderbilt Hospital, Nashville, Tenn.

Dr. Harold Swanberg (Fellow), Quincy, Ill., read a paper on "Uterine Cervical Cancer; Radium Versus Surgery" before the annual meeting of the American Congress of Physical Therapy in St. Louis, September 8.

Dr. E. V. Goltz (Fellow), St. Paul, is the author of an article entitled "Primary Carcinoma of the Lungs and Bronchi" in the September Issue of Minnesota Medicine.

Dr. James K. Hall (Fellow), Richmond, Va., has been appointed a member and Chairman of the Committee on Ethics and Judiciary of the Medical Society of Virginia to fill the vacancy caused by the death of Dr. Garnett Nelson (Fellow), of Richmond.

Dr. O. H. Perry Pepper (Fellow), Philadelphia, is the author of an article, "Tardy Symptoms of Congenital Lesions," appearing in the September Issue of the Virginia Medical Monthly.

Dr. Philip S. Smith (Fellow), Abingdon, Va., has an article in the same issue, entitled, "Symptomatology of Hypothyroidism."

Dr. Roscoe H. Beeson (Fellow), Muncie, Ind., Dr. J. A. Bargen (Fellow), Rochester, Minn., and Dr. James B. Herrick (Fellow), Chicago, Ill., spoke on "State Medicine," "Diseases of the Colon," and "Importance of the History and Physical Examination in Diagnosis," respectively, at the 81st annual session of the Indiana State Medical Association at Fort Wayne, September 24-26.

At the 56th annual meeting of the Oregon State Medical Society at Portland, September 18-20, Dr. Noble Wiley Jones (Fellow), with Dr. Samuel J. Newsom, delivered a paper on "Experimental Focal Infection in Relation to Cardiac Pathology"; Dr. Frank R. Menne (Fellow) and Dr. Marr Bisaillon (Fellow), with Dr. Thomas Robertson, delivered a paper on "Primary Bronchogenic Carcinoma, a Clinical and Pathologic Study."

Dr. Paul H. Ringer (Fellow), Asheville, N. C., and Dr. Horton R. Casparis (Fellow), Nashville, Tenn., conducted a course of clinics at the South Carolina State Park Sanatorium, July 30-31, under the auspices of the South Carolina Tuberculosis Association and the State Board of Health, for South Carolina physicians.

Surgeon-General Hugh S. Cumming (Fellow), U. S. Public Health Service, addressed the American Catholic Hospital Association of the United States and Canada at Washington, September 2-5, on the subject, "The Hospital as a Factor in Public Health."

Dr. Oliver P. Kimball (Fellow), Cleveland, Ohio, received honorable mention for his essay dealing with the goiter problem, as submitted to the American Association for the Study of Goiter at their Seattle meeting some weeks ago.

Dr. Peter M. Murray (Fellow), New York, N. Y., was elected President-Elect of the National Medical Association at its 35th annual session at Indianapolis, during late August.

Dr. David Marine (Fellow), New York, N. Y., addressed the American Chemical Society's meeting at Cincinnati, September 8-12, on "The Possible Nature of the Goiter-Preventing Agent in Plants."

Dr. Nathan S. Davis, III (Fellow), Chicago, addressed the Rock Island County Medical Society, September 9, on "Diagnosis and Treatment of Heart Disease."

The Northern Minnesota Medical Association held its annual meeting, September 19-20, at Moorhead, Minn. Among Fellows of the College on the program for stated addresses were:

Dr. Walter C. Alvarez, Rochester—"Methods of Diagnosing Gastro-Intestinal Disease from a Careful History of the Symptoms";

Dr. Henry W. F. Woltman, Rochester—(Subject not announced)

The Clinical Committee of the Medical Society of the County of Kings each year offers a fall series of practical lectures. A number of the Fellows of the American College of Physicians appear on their programs:

October 10:

Dr. George I. Swetlow, Brooklyn—"Pain: Its Diagnostic Significance: Its Treatment by Alcohol Nerve Block";

October 17:

Dr. Walter C. Alvarez, Rochester—"Physiologic Knowledge Applied to Treatment of Gastro-Intestinal Diseases";

October 31:

Dr. C. Saul Danzer, Brooklyn—"Arteriosclerosis: Some Phases of the Newer Knowledge Applicable in General Practice."

November 7:

Dr. Murray B. Gordon, Brooklyn—"Endocrine Diseases and Disorders in Children";

November 14:

Dr. Robert A. Cooke, New York City—"Allergic Conditions Encountered in General Practice";

November 28:

Dr. John A. Lichty, Clifton Springs—"Diarrhea."

Dr. W. McKim Marriott (Fellow), St. Louis, gave the following series of postgraduate lectures under the auspices of the Academy of Medicine of Lima and Allen County, Ohio:

September 15: "Practical Points in Care and Feeding of Infants" and "Recent Investigations on Nature and Treatment of Nephritis";

September 16: "The Clinical Application of Recent Studies Concerning Chemical Equilibrium in the Body" and "The Application of Specific Measures in the Prophylaxis and Treatment of Infectious Diseases."

Under the presidency of Surgeon-General M. W. Ireland (Fellow), Washington, D. C., the American College of Surgeons held its 20th annual clinical congress in Philadelphia, October 13-17, with headquarters at the Bellevue-Stratford Hotel.

Dr. Thomas C. McCleave (Fellow), Berkeley, Calif., addressed the Alameda County (Calif.) Medical Society, September 15, on "Bacteriophage Treatment of Typhoid."

Dr. Wardner D. Ayer (Fellow), Syracuse, used as his subject "Neurological Aspect of the Fractured Skull" in an address before the Sixth District Branch of the Medical Society of the State of New York at Cooperstown, September 23.

Dr. Elliott P. Joslin (Fellow), Boston, was guest speaker at the opening of a diabetic camp on the estate of Dr. Henry J. John (Fellow) in Geauga County (Ohio), during the summer.

Dr. Carl J. Wiggers (Fellow), Cleveland, represented Western Reserve University at the medical meetings in Brussels held during the summer, celebrating the one hundredth anniversary of Belgian independence.

Dr. Christopher G. Parnall (Fellow), Rochester, N. Y., presided at the 32nd annual convention of the American Hospital Association at New Orleans, October 20-24. Among the speakers were Dr. Ernest S. Mariette (Fellow), Oak Terrace, Minn., his subject being, "The Sanatorium, Past, Present and Future."

Among speakers and their addresses at the 41st annual meeting of the Association of American Medical Colleges, held at the University of Colorado School of Medicine, Denver, October 14-16, were the following Fellows:

Dr. Harold E. Robertson, University of Minnesota Graduate School of Medicine —"Development of the Liaison Activities of a Department of Pathology";

Dr. Charles C. Bass, Tulane University of Louisiana School of Medicine—"New Teaching Clinic and Curriculum at Tulane";

Dr. Torald H. Sollmann, Western Reserve University School of Medicine—"Report of Committee on Aptitude Test";

Dr. Walter A. Bloedorn, George Washington University School of Medicine—"Relation of Autopsies to Teaching."

Dr. A. S. Warthin (Master) delivered three addresses before the Utah State Medical Association at the Meeting in Salt Lake City, September 9-12.

Dr. B. S. Pollak (Fellow), Medical Director of the Hudson County Tuberculosis Hospital and Sanatorium, Secaucus, N. J., returned about September first from Oslo, Norway, where he was a delegate to the International Union Against Tuberculosis. Dr. Pollak was also a delegate to the Second Congress at Stockholm.

Dr. Grafton Tyler Brown (Fellow), Washington, D. C., has been re-elected Chairman of the Membership Committee of the Medical Society of the District of Columbia.

Dr. C. O. Bailey (Fellow), Dallas, Texas, read a paper on "Carcinoma of the Cervix Uteri: With Treatment" before the Texas State Medical Association in annual session at Mineral Wells, May 7.

Dr. Roger M. Choisser (Fellow), Washington, D. C., Lieutenant Commander, Medical Corps, U. S. Navy, and Director of Laboratories, U. S. Naval Medical School, read a paper before the Fairfax County Medical Society of Virginia, August 7, on the "Recent Advances in Medical Diagnosis by Means of Laboratory Procedures."

Dr. Joseph Doane (Fellow), Philadelphia, is scheduled to address the American College of Surgeons and the Pennsylvania State Medical Association at their annual meetings in October. Dr. Doane is Associate Professor of Medicine in the Graduate School of Medicine of the University of Pennsylvania, and Associate Professor of Medicine in the Temple University School of Medicine.

Dr. William D. Reid (Fellow), Assistant Professor of Cardiology at the Boston University School of Medicine, has published the following papers since January 1, 1930:

"The Prognosis of Heart Diseases in Pregnancy"—American Journal of Obstetrics and Gynecology, January, 1930

"The Treatment of Neurosis (Cardiac)" —New England Journal of Medicine, February 6, 1930

"Spinal Deformity as Cause of Cardiac Hypertrophy"—The Journal of the

American Medical Association, February 15, 1930

"Wenckebach: Angina Pectoris (translation)"—Medical Journal and Record, February 19 and March 5, 1930

"The Differential Diagnosis of Cardio-vascular Syphilis"—The American Journal of Syphilis, April, 1930

"Permanent Bradycardia Following Diphtheria, Case Report"—American Heart Journal, April, 1930

At the annual meeting of the American Heart Association at Detroit, June 24, he delivered an address on "The Diagnosis of Cardiovascular Syphilis".

Under the auspices of the Gorgas Memorial Institute, an article entitled "Trench Mouth", by Dr. Oliver T. Osborne (Fellow), Emeritus Professor of Therapeutics, Yale School of Medicine, was syndicated in a large number of daily papers on July 15.

Lieutenant Colonel Reynold Webb Wilcox, M.D., D.C.L. (Fellow) and Ex-President), is recovering from a severe illness of July at his country place in Madison, Conn. He will shortly return to his home at 90 Bayard Lane, Princeton, N. J., where he will be glad to see his friends.

Dr. Louis A. Milkman (Associate), Scranton, Pa., delivered a paper before the Pennsylvania Roentgen Ray Society at Huntington, Pa., May 14, 1930, on "Bone Lesions as seen by the Roentgenologist".

Dr. Milkman is the author also of a paper on "Pseudofractures (Hunger Osteopathy, Late Rickets, Osteomalacia)" in the July Issue of the American Journal of Roentgenology and Radium Therapy.

Dr. Carl V. Vischer (Fellow), Philadelphia, is the author of a case report, "Multiple Sarcomata", which appeared in the August Number of the Hahnemannian Monthly.

Dr. T. E. Rogers (Fellow), Macon, Ga., discussed clinical cases at the Macon Medical Society's meeting on July 2.

Dr. Henry Green (Associate), Dothan, Ala., was elected a member of the Council of the Chattahoochee Valley Medical and Surgical Association, July 9.

Dr. Edson W. Glidden (Fellow), former Superintendent of the Georgia State Tuberculosis Sanatorium at Alto, has accepted an appointment as Superintendent and Medical Director of the Worcester County Sanatorium at Worcester, Mass.

Practically all of the Officers of the American Therapeutic Society for 1930-31 are members of the American College of Physicians, as follows:

President, Clement R. Jones (Fellow); 1st Vice President, William J. Mallory (Fellow); 2nd Vice President, William Engelbach (Fellow); 3rd Vice President, Leonard Murray (Fellow); Secretary, Grafton Tyler Brown (Fellow); Treasurer, Truman G. Schnabel (Fellow).

COUNCIL

Chairman, Noble P. Barnes (Fellow); Secretary, Grafton Tyler Brown (Fellow); Oscar W. Bethea (Fellow), Harlow Brooks (Fellow), Truman G. Schnabel (Fellow), Harvey G. Beck (Fellow), Charles G. Jennings (Master), William Fitch Cheney (Fellow), E. Bosworth McCready (Fellow), Frank Smithies (Master), Francis M. Pottenger (Fellow); Editor, Alpheus F. Jennings (Fellow).

GIFTS TO THE COLLEGE LIBRARY

The following donations of reprints have been acknowledged, indexed and duly added to the College Library of publications by members:

Dr. Frederic J. Farnell (Fellow), Providence, R. I.:

One Reprint—"The Individual Criminal and His Cure"

Dr. Alvis E. Greer (Fellow), Houston, Texas:

Three reprints—"The Physician of Yesterday and Tomorrow", "Pulmonary Syphilis", "Dental Infections and Systemic Disease"

Dr. Louis A. Milkman (Associate), Scranton, Pa.:

One Reprint—"Pseudofractures (Hunger Osteopathy, Late Rickets, Osteomalacia)"

Dr. H. Brooker Mills (Fellow), Philadelphia, Pa.:

Two Reprints—"Infant Feeding", "Pyloric Obstruction"

Dr. Carl V. Vischer (Fellow), Philadelphia, Pa.:

One Reprint: "Multiple Sarcomata"

There are a number of books, of which Fellows of the College are authors, that have not yet been donated to the College Library. Fellows are urged especially to donate copies of their books to this Library, which will become a memorial to the College members.

Dr. E. Roland Snader, Jr. (Fellow), Philadelphia, Assistant Physician to the Hahnemann Hospital, held a clinic in Physical Diagnosis before the students on May 1. The report of the clinic, "Congestive Heart Failure", was published in a recent issue of the Hahnemannian Monthly.

Dr. Cyrus W. Strickler (Fellow), Atlanta, delivered a paper on "The Pneumonias" at the Tenth District Medical Society's meeting at Louisville, August 28.

Dr. T. F. Abercrombie (Fellow), Atlanta, Commissioner of Health, attended the conference on Malaria at Sandersville, Ga., August 6, said conference having been arranged by the Washington County Medical Society in co-operation with several other organizations.

Dr. William R. Dancy (Fellow), Savannah, Ga., was elected First Vice Commander-in-Chief of the Sons of Confederate Veterans at their recent reunion at Biloxi, Miss.

Dr. Thomas B. Futcher, Baltimore, has been elected President of the Association of American Physicians.

Dr. Wilburt C. Davison (Fellow), formerly Assistant Dean of Johns Hopkins University Medical School, Baltimore, now Dean of the Duke University Medical School, heads the staff of the new $4,000,000 hospital and medical school, which was opened in July. The hospital has a capacity of four hundred beds, the largest general hospital in the Carolinas. The medical school, which opened October 1, has a maximum capacity for three hundred students.

Dr. William deB. MacNider (Fellow), Chapel Hill, N. C., has been elected as Examiner in Pharmacology on the National Board of Medical Examiners.

Dr. Albert H. Hoge (Fellow), Bluefield, W. Va., has been appointed by the Governor of that state as a member of the West Virginia Public Health Council.

Dr. Otis B. Nesbit (Fellow), Gary, Ind., recently resigned as a member of the Board of Managers of the Lake County Tuberculosis Hospital.

Dr. G. Harlan Wells (Fellow), Philadelphia, delivered the Endowment Lecture before the American Institute of Homeopathy at Montreal, Canada, on June 26, 1930. The Lecture, "Homeopathy and the newer Concept of Cellular Therapy", was published in the August, 1930, Issue of the Journal of the American Institute of Homeopathy.

Dr. Ross V. Patterson (Fellow), Dean of Jefferson Medical College of Philadelphia, was installed at President of the Pennsylvania State Medical Association at its Johnstown meeting, October 7.

The following Fellows of the College contributed papers:

Dr. Joseph T. Beardwood, Jr., Philadelphia (With Frederick A. Bothe, Philadelphia): "Surgery and Diabetes"

Dr. Joseph C. Doane, Philadelphia: "Is the Inauguration of the Teaching of Clinical Medicine in a General Hospital Possible?"

Dr. T. Grier Miller, Philadelphia: "The Precursors of Cancer of the Stomach"

Dr. Henry R. M. Landis, Philadelphia (With Jacob W. Cutler, Philadelphia): "The Medical Aspects of Renal Tuberculosis"

Dr. Francis J. Dever, Bethlehem: "Symptomless, Extensive Carcinoma in the Abdominal Cavity with Fatal Hemorrhage"

Dr. Stanley D. Conklin, Sayre, Pa.: "Acute Pneumococcic Peritonitis with Acute Empyema—Left, Metastatic"

Dr. Walter M. Bortz, Greensburg, Pa.: "Hepatomegaly"

Dr. Jesse L. Lenker, Harrisburg: "Pericarditis Calculosa"

Dr. Roy R. Snowden, Pittsburgh: "The Diagnosis of Hyperthyroidism"

Dr. Emanuel Libman, New York City (Guest): "Clinical Studies on Pain in Medical and Surgical Conditions"

Dr. Horace B. Anderson, Johnstown: "Diagnosis of Early Circulatory Insufficiency"

Dr. George W. Grier, Pittsburgh: "Roentgen Diagnosis of Empyema"

Dr. Harold W. Jones, Philadelphia: "Practical Points Concerning Blood Transfusion"

Dr. Alvin E. Siegel, Philadelphia: "Is There an Ideal Infant Food?"

Dr. Harvey O. Rohrbach (Associate), Bethlehem, gave a paper on "Proper Use of Insulin and Diet in Juvenile Diabetes".

Dr. William J. Kerr (Fellow), San Francisco, is Chairman of the San Francisco Heart Committee, which was recently organized by a group of one hundred members of the San Francisco County Medical Society to amalgamate all interests in the City concerning problems of heart disease.

Dr. Fred M. Smith (Fellow), Iowa City, addressed the Iowa State Dietetic Association at its annual meeting, July 18-19, on "The Irritable Colon."

Dr. Isaac I. Lemann (Fellow), New Orleans, addressed the Orleans Parish Medical Society, recently, on "Meningococcemia for Eight Months Following Meningitis Recovery".

Drs. Clifford J. Barborka (Fellow), Rochester, Minn., and Rodney W. Bliss (Fellow), Omaha, Nebr., addressed the Elkhorn Valley Medical Society of Nebraska, July 29, on obesity and on the heart, respectively.

Dr. Henry D. Jump (Associate), Philadelphia, addressed the Cumberland County (New Jersey) Medical Society, July 8, on quinidin in heart disease.

Dr. James J. McGuire (Fellow), Trenton, N. J., was elected Secretary of the New Jersey State Board of Medical Examiners on July 10.

Dr. David Riesman (Fellow), Philadelphia, delivered the oration in medicine entitled, "Hypertension and Longevity", at the 89th annual meeting of the Wisconsin State Medical Society at Milwaukee, September 10-12.

Dr. Frederick C. Rinker (Fellow), Norfolk, Va., was made President of the newly formed Second District Medical Society at Suffolk, Va., recently.

Dr. Casper H. Benson (Fellow), Columbus, Ohio, was the chief speaker at the joint meeting of the Preston and Monongahelia County Medical Societies (West Virginia), held at the State Tuberculosis Sanatorium, Hopemont, July 15. Dr. Benson's subject was "Early Diagnosis of Pulmonary Tuberculosis".

The Children's Free Hospital of Louisville has become affiliated with the School of Medicine of the University of Louisville. Dr. Philip F. Barbour (Fellow) is Chief of Staff of the Hospital, and Dr. John Walker Moore (Fellow), Dean of the Medical School, is a member of the Executive Committee, ex officio.

Dr. Walter E. Vest (Fellow), Huntington, used as his title, "The Importance of Attendance at Medical Meetings" in a talk delivered at the third quarterly meeting of the Central West Virginia Medical Society, July 16.

OBITUARY

Dr. Isidor Betz (Associate), Brooklyn, N. Y., died July 13, 1930, of gall stones; aged 45 years.

Dr. Betz graduated from the Long Island College Hospital in 1910. He did postgraduate work during 1927 at the University of Vienna. He was a member of the North Brooklyn Medical Association, the Williamsburgh Medical Society, the New York State Medical Association and the American Medical Association. He was an Associate of the American College of Physicians by virtue of his membership in the American Congress on Internal Medicine, before the merger of the Congress with the College.

Dr. Betz was consultant at the Menorah Home for Aged and a member of the staffs of Greenpoint, Beth Moses and St. Catherine's Hospitals.